PARENTS' ATTRIBUTIONS, EXPECTATIONS, ACHIEVEMENT-SUPPORTING BEHAVIORS, AND CHILDREN'S ACADEMIC ACHIEVEMENT IN TAIWAN

By

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By

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The purpose of this study was to explore the model of relationships between the attributions, expectations, and achievement-supporting behaviors of Taiwanese parents and their children's academic achievement; and to analyze the differences of parents' attributions, expectations, and achievement-supporting behaviors between father's educational level and between child's sex. The sample was composed of 554 sixth-grade students and their parents from 12 randomly selected elementary schools. While parents filled out a questionnaire adapted from Stevenson's Parents' Interview Questionnaire, students were given a standardized mathematics achievement test, a standardized reading achievement test, and Standard Progressive Matrices Test. The number of parents' questionnaires and students' scores that were useful for analysis was 440. A two-way analysis of covariance and a path analysis with the use of a series of multiple regressions was used to analyze the data.

No significant differences in parents' attributions of children's academic performance were found between father's educational level and between child's sex. Significant differences were found in parents' expectations of children's education between father's educational level. Among nine items of parents' achievement-supporting behaviors, significant differences between father's educational level appeared in time for homework, number of supplementary lessons, time for television, time for supplementary lessons, and resources for learning; significant differences existed between child's sex in time for homework, number of supplementary lessons, and punishment for poor performance. Through factor analysis, two common factors were identified among variables of parents' achievement-supporting behaviors, which were labelled as homework and parents' supporting behaviors.

For children's mathematics achievement, the influence included strong effects from child's IQ and parents' expectations, moderate effects from father's education and parents' supporting behaviors, and a small effect from child's sex. For children's reading achievement, the influence consisted of strong effects from child's IQ and parents' expectations, moderate effects from father's education and child's sex, and a small effect from parents' supporting behaviors. Homework had no effect either on mathematics achievement or on reading achievement.

CHAPTER I
INTRODUCTION

Although Asian-Americans make up only about 3% of the population of the United States, they constitute from 17% to 27% of the undergraduate students enrolled at universities such as Harvard, MIT, and Berkeley (Butterfield, 1990). This phenomenon has generated a good deal of attention, and explanations for it have included that Asian students are more academically talented, put more effort into their studies, and have parents who value their children's education more than American parents (Stevenson, 1983). A number of researchers have compared American and Asian students, primarily Japanese or Chinese, on academic variables such as mathematics achievement. In these studies, Asian students consistently scored higher than their American counterparts (Garden, 1987; Lee & Stevenson, 1987; Stevenson, 1983; Stevenson & Lee, 1990; Stevenson, Stigler, Lee, & Lucker, 1985).

From 1980 to 1989, Harold Stevenson and his associates completed four large cross-national studies on the correlates of the academic achievement of children in two American cities, Minneapolis and Chicago, one Chinese city, Taipei, and one Japanese city, Sendai. After demonstrating that Japanese and Chinese students had significantly higher mathematics achievement scores than American students, Stevenson proposed a number of explanations for these differences, including that differences in home and school experiences might contribute to differences in achievement (Stevenson, Stigler, Lee, & Lucker, 1985). The explanation of greater academic talent was not supported by the data, but Stevenson (1983) reported that Asian parents attributed academic success more to hard work than did American parents. He suggested that these differences in attributions of academic success might well influence children's school achievement through the kinds of experiences that parents provide at home. These attributions were assumed to be the major reason for the different home experiences provided to American and Asian children. Stevenson (1983) noted that

> [American] parents who believe success depends more upon ability than effort are less likely to require their children to work hard at learning than [Asian] parents who believe that effort is more important. The differences may explain why American children spend so little time doing homework, and also why they were found to be less likely than Chinese and Japanese children to attend after-school classes. The greater emphasis of American mothers on ability may be another variable that underlies their children's lower achievement in elementary school. (p. 10)

Asian parents may also have higher expectations for their children's school performance. While Stevenson (1983) and Stevenson and Lee (1990) found few Chinese and Japanese mothers who were satisfied with their children's current academic performance, American mothers were satisfied even though their children performed less well. He suggested that there are relationships among parents' attributions of academic success, expectations of children's school performance, practical achievement-supporting behaviors, and children's school achievement. His data, however, did not provide empirical evidence to support these relationships.

Statement of the Problem

Stevenson (1983) and Stevenson and Lee (1990) explored cross-national differences in academic achievement among American, Chinese, and Japanese children. With the cooperation of Japanese and Chinese researchers, they investigated children's academic achievement, the involvement of the family in the child's education, standards and expectations of parents concerning their child's academic achievement, and parents' beliefs about the relative influence of effort and ability on academic achievement. They found that Japanese and Chinese parents placed more emphasis on effort and set higher standards for their children's school performance than American parents. Japanese and Chinese children (especially Chinese children) spent more time doing homework and attending after-school classes, less time watching television and playing, and obtained higher scores on mathematics achievement tests.

These results suggest that relationships exist between children's school performance and parents' attributions, expectations, and achievement-supporting behaviors. However, Stevenson did not specifically demonstrate relationships among the variables, and although such relationships could reasonably explain why the children's achievement was different among cultures, he was unable to demonstrate the existence of differences within a specific culture. In a cross-cultural study, Chen and Stevenson (1989) found that time spent on homework was positively correlated with children's academic success among three cultures but reported no significant correlations within the cultures themselves. Therefore, the careful examination of the relationship of these variables within a specific culture would make an important contribution to this field.

Stevenson also chose the city of Taipei in Taiwan to represent China in his cross-cultural studies of children's achievement context. Taipei, the capital of the Republic of China, is the largest and richest city in Taiwan; students generally come from families with a higher socioeconomic status than those in other areas. Therefore, a study with a more representative sample would more accurately reflect the relationships among the attributions, expectations, and achievement-supporting behaviors of Taiwanese parents and the academic achievement of their children.

Stevenson's hypotheses generally agree with Weiner's attribution theory (1979, 1985, 1986), which proposed a sequence from attributions to expectancy of success to behavioral consequences. Weiner identified ability and effort as the attributions most relevant to academic achievement and noted that an attribution's influence on expectancy and behavior is determined by where the attribution falls on three dimensions: locus of causality, stability, and controllability. Ability and effort are considered internal attributions, but effort is unstable and controllable, while ability is stable and uncontrollable. Thus, if parents attribute effort as the main reason for their child's school success, they may maintain a high expectancy of success for their child even though their child fails, and they may try to perform achievement-supporting behaviors to help the child counteract the failure. If the failure is ascribed to low ability, however, expectancy of success may be minimized following failure, and achievement-supporting behaviors may be less emphasized.

According to Weiner, an important mediating variable between attributions and behavioral consequences is expectancy of success, which denotes the anticipation of probability of success after an outcome and is affected by the attributions of that outcome while influencing subsequent behaviors. Expectation is a term similar to expectancy of success but not directly connected to a specific outcome, and correlational studies have found relationships between parents' expectations and children's academic performance (Entwisle & Baker, 1983; Entwisle & Hayduk, 1978; McGigliotti & Brookover, 1975; Seginer, 1986).

Analyzing the cause and effect of parents' expectations, Entwisle and Hayduk (1981) suggested that parents form a general estimate of their child's ability on the basis of their impression of their child's intelligence and then use that estimate, along with other information, to form their expectations. In addition, parents' expectations are tempered by consideration of their child's sex. These expectations may also influence a child's academic performance through parents' achievement-supporting behaviors such as direct coaching or providing a supportive home environment.

Seginer (1983) offered a more detailed analysis of the relationships between parents' expectations and children's academic achievement. She proposed a model of the course of parents' educational expectations that placed emphasis on the antecedents of parents' expectations and the mediating variables between these expectations and children's academic achievement. The model included three main antecedents: (a) school feedback concerning the child's academic achievement, (b) parents' own aspirations, and (c) parents' knowledge.

The mediating factors between parents' expectations and children's achievement included (a) achievement-supporting behaviors, (b) differential reinforcement, and (c) the child's educational aspirations.

Both Seginer's and Entwisle and Hayduk's analyses stressed parents' behaviors as mediators between their expectations and their children's academic achievement. However, parental behaviors or family environments that have a positive influence on children's learning are not easy to identify. Stevenson (1983) and Stevenson and Lee (1990) investigated variables such as homework, television watching time, after-school classes, reinforcement, and punishment, while Seginer (1986) listed contact with the classroom teacher, supplementary lessons, parents' further study, reinforcement, and punishment as constituting achievement-supporting behaviors. Moreover, parental behaviors or family environments are often thought to be influenced by family socioeconomic status. Laosa (1982) reported that the educational level of parents, one of the major indicators of family socioeconomic status, was probably the most basic variable for predicting student's achievement, because it was linked to parents' interest in and attitude towards education. He suggested that well-educated parents value education highly, expect their children to become well educated, and, consequently, may provide better environments for their children's learning. Not surprisingly, McGillicuddy-De Lisi (1985) suggested that it was important to investigate the influence of parents' level of education on child outcomes because parents' beliefs, behaviors, and children's level of cognitive functioning were each likely to be related to the educational status of the parent.

The above analysis seems to imply that a relationship may exist among parents' attributions, parents' expectations, and achievement-supporting behaviors, and that these variables may consequently affect children's academic performance. Parental behaviors were considered the mediators between parents' beliefs (e.g., attributions and expectations) and child outcomes (e.g., academic performance). Parents' beliefs, however, are also directly related to child outcomes, and McGillicuddy-De Lisi (1985) has suggested path analyses to estimate the relative effects of these beliefs and their effect on both parents' behaviors and child outcomes.

Stimulated by Stevenson's research, and based on Weiner's attribution theory and Seginer's model of the course of parents' educational expectations, this researcher hypothesized a model of the relationship between parents' attributions, expectations, achievement-supporting behaviors and children's school achievement which is illustrated in Figure 1.

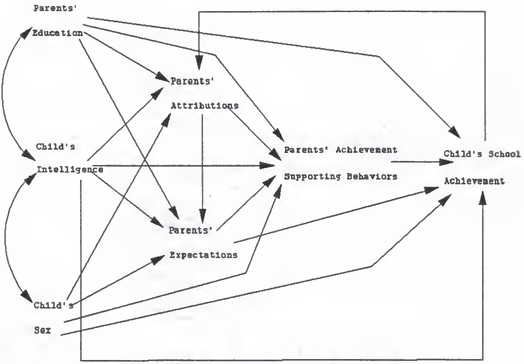

Figure 1. Relationships among Parents' Attributions, Expectations, Achievement-Supporting Behaviors and Children's Academic achievement

Purpose of the Study

The purpose of this study is to investigate Taiwanese parents' attributions of their children's academic performance, expectations of their children's education, and achievement-supporting behaviors. The relationship of these variables and their children's academic achievement was analyzed, and the effects of father's educational level, child's sex and IQ on these variables was also examined.

Specifically, using a more representative sample than that used by Stevenson in Taiwan, three questions were addressed:

1. What are the differences in parents' attributions, expectations, and achievement-supporting behaviors between fathers with different educational level?

2. What are the differences in parents' attributions, expectations, and achievement-supporting behaviors for male and female children?

3. What are the relationships among parents' attributions, expectations, achievement-supporting behaviors, and children's academic achievement, where fathers' educational level, children's sex, and children's IQ are included as exogenous variables?

Significance of the Study

This study was based upon the studies by Stevenson and associates regarding family influences on children's academic achievement in Taiwan. Stevenson's emphasis was on cross-cultural comparisons of children's achievement contexts. He did not focus on a detailed analysis within a specific culture, and his findings about Chinese parents' beliefs, practices, and children's academic achievement came only from the sample of a single city, Taipei, the largest and richest city in Taiwan. Stevenson did not analyze the probable effects of family socioeconomic status, child's IQ, and child's sex on parents' attributions, expectations, and achievement-supporting behaviors. However, his general descriptions of Chinese family influences on children's academic achievement provided meaningful avenues for additional study. This study, comprising a more representative sample and a more detailed analysis of relevant variables, was designed to provide a more accurate picture of Taiwanese parents' beliefs and practices about their children's education.

The major focus of this study was to explore the relationship between children's academic achievement and parents' attributions, expectations, and achievement-supporting behaviors. Although the interrelationship among parents' beliefs, parents' practices, and child outcomes has been demonstrated (McGillicuddy-De Lisi, 1985), little research has investigated the effects of both attributions and expectations on parent achievement-supporting behaviors and, subsequently, children's academic performance. It is hoped that the results of this study will provide strategies and insights that American parents and educators may use to improve their children's academic achievement.

Definition of Terms

The following definitions are used throughout this study.

Attributions refer to an individual's perceived causes of an event (Bell-Gredler, 1986), particularly the perceived causes of success and failure in achievement related situations (Weiner, 1985). In this study, attributions are typical explanations of children's academic performance and are represented by child's effort, child's ability, teacher's teaching, parents' help, and luck.

Expectations are the cognitive orientational aspect of goal-directed behavior defined for a person by a significant other (Haller, 1968). In this study, two indicators are used to represent parents' educational expectations: level of education to be achieved by the child and test scores expected of a child.

Achievement-supporting behaviors refer to the help that parents provide in order to improve their child's academic performance (Seginer, 1986). In this study, they are procedures adopted by parents to enhance their children's academic achievement, and the following items, selected from Stevenson (1983, 1990) and Seginer (1986), will be used to represent these behaviors.

1. Time for homework refers to the amount of time a child spends on studying outside of class. In this study, it is represented by the number of hours per week that a child spends on homework assigned by teachers and additional study required by parents.

2. Time for watching television refers to the number of hours per week a child spends watching television.

3. Treatment of poor academic performance refers to methods that parents use to treat their children's poor academic achievement in school. In this study, treatment will be divided into help and punishment.

4. Tutor for academic subjects refers to efforts that parents make to arrange tutoring help for their children's learning in academic subjects such as reading and mathematics. In this study, this is represented by the number of hours per week a child is tutored.

5. Supplementary lessons outside of school refers to parents' attempt to broaden their children's learning by enrolling them in out-of-school classes such as music, art, sport, abacus, computer, second language, and others. In this study, this is represented by the number of lessons a child has attended and the number of hours per week a child currently participates in these lessons.

6. Resources for learning refers to resources that parents provide to assist their children's learning. In this study, this is represented by the number of kinds of reading materials, including newspapers, magazines, dictionaries, encyclopedias, and enrichment textbooks, that parents purchase for their children.

Academic achievement is represented by children's scores on standardized achievement tests of mathematics and reading. Specifically, academic achievement will be represented by children's scores on the Mathematics Achievement Test developed by the Taiwan Provincial Teachers' Study Institute in 1986 and on the Reading Achievement Test developed by the Taiwan Normal University in 1984.

IQ is represented by the children's score on the Standard Progressive Matrices (Raven, 1958, 1983).

Father's educational level is divided into four categories: elementary school or less, junior high school, senior high school, and higher education, which includes junior college, college, and graduate school.

CHAPTER II
LITERATURE REVIEW

The purpose of this study was to investigate the relationship between the attributions, expectations, and achievement-supporting behaviors of Taiwanese parents and their children's academic achievement. Weiner's attributional theory provides the theoretical foundation for the study and hence is reviewed first. Studies that examine parents' attributions of their children's academic performance are examined in the second section, and studies dealing with parents' expectations of their children's education in the third, followed by the literature related to parents' achievement-supporting behaviors. A summary concludes the chapter.

Weiner's Attributional Theory

Weiner's attributional theory is "a theory of motivation and emotion centered around the concept of causal ascriptions" (Weiner, 1986, p. 3), with achievement strivings as the theoretical focus. Generally, this theory put emphasis on an individual's perceived causes of an event or an outcome, the antecedents of these causes, and their consequences.

Perceived Causality

Weiner (1986) indicated that "a motivational sequence or episode is initiated following an event or an outcome, particularly success or failure at an achievement-related activity" (p. 15). Under certain conditions such as failing in an important test or succeeding in a strict competition, Subjects tend to search for the cause of the outcome. In an early study Weiner (Weiner et al., 1971) asked participants to rate the importance of four causes of success and failure: ability, effort, task difficulty, and luck. "More specifically, they were asked to rate the relative contribution of high or low ability, high or low effort, ease or difficulty of the task, and good or bad luck to their success or failure in a task" (Weiner, 1986, p. 37).

However, the causes of achievement might not be exhausted by ability, effort, task difficulty, and luck. Two procedures were used to discover if subjects attributed success and failure to other factors. The first was the use of free-response. Subjects were provided the information of success or failure in a task and then was asked to list every cause that came to mind for explaining this outcome. The second was to provide the subject a large list of causes which were collected through the use of free-response and then to require the subject to appraise the relative contribution of each cause on a hypothesized outcome (Weiner, 1985, 1986). Using these two procedures, a vast variety of causes has been documented. Among them, the following seven items were mentioned most frequently: ability, effort, task characteristics, intrinsic motivation, teacher's competence, mood, and luck. The most dominant were ability and effort. That is, success was ascribed to high ability and hard work, and failure was attributed to low ability and the absence of effort (Weiner, 1979).

Structure of Perceived Causality

Examining the property of perceived causality, Weiner (1986) indicated

> The logical analysis of causality yields three dimensions: locus of causality, stability, and controllability. Each of these properties was conceived as a bipolar continuum, identified at the extremes with the labels internal-external, stable-unstable, and controllable-uncontrollable. (p. 50)

Locus of causality refers to the origin of the perceived reason for success or failure. Internal causality means that the cause of an outcome is dependent on the individual, and external causality means that the outcome is determined by the environment. For example, both ability and effort are perceived as internal to the person, whereas task difficulty and luck are considered external causes. Stability refers to the endurance of particular attributions. Some factors such as effort and mood are variable, but others such as ability and task difficulty remain relatively constant. However, the stability of a cause can vary. Ability may be perceived as unstable when it indicated skill or knowledge rather than aptitude, and effort may be invariant when it was considered as a personality trait (Weiner, 1983). Controllability refers to the presence or absence of the actor's volitional control. Some causes are controlled by individual's determination such as effort, whereas others are independent of one's manipulation such as ability. The properties of the four major causes are these: both ability and effort have internal causality, but ability is stable and uncontrollable, while effort is unstable and controllable. Task difficulty and luck are external and uncontrollable, but task difficulty is stable, while luck is unstable.

Attributions, Expectations, and Consequences

Weiner's (1985) attributional theory maintained that "the stability of a cause, rather than its locus determines expectancy shifts" (p. 556). He stated

> If conditions (the presence or absence of causes) are expected to remain the same, then the outcomes experienced on past occasions will be expected to recur. A success under these circumstances will produce relatively large increments in the anticipation of future success, and a failure will strengthen the belief that there will be subsequent failures. However, if the causal conditions are perceived as likely to change, then the present outcome may not be expected to repeat itself in the future, or there may be uncertainty about subsequent outcomes. A success, therefore, would yield relatively small increments, and perhaps decrements in the expectancy of subsequent success, whereas a failure need not necessarily intensify the belief that there will be future failures. (Weiner, 1986, p.85)

For example, if the subject attributed success on an important test to good luck, expectancy of future success might not be high because luck is an unstable cause which changes from moment and moment. But, if the reason for success was attributed to high ability, one will maintain or increase the expectancy of future success because ability is a stable cause which remains constant in most situations. In contrast, for the failure situation, if the reason was considered as one's own low ability, the expectancy of success might be decreased because one can not change ability; but if it was attributed to inadequate effort, the positive expectancy of success might not be changed because the subject believes that working harder will bring future success. Therefore, if failure is seen as being due to lack of trying rather than to low ability, the higher will be the expectancy of success for the future. The reason is that ability is a stable cause of success and failure, whereas effort is perceived as unstable in most situations involving failure. Effort tends to be perceived as relatively stable in situations of success. Therefore, the attributions of effort may bring positive expectations in the future with both success and failure, whereas the ascriptions of ability will produce high expectations of success but negative expectations of failure.

It has been hypothesized that behavioral intentions are mainly determined by expectations of future success (Fishbein & Ajzen, 1975). Therefore, "causal ascriptions, which influence expectancy of success, should also affect behavioral intents" (Weiner, 1986, p. 98). "It is believed that because attributions modify expectancy and affect, they also play an important role in determining the speed of performance, choice, persistence, and other motivated behaviors" (Weiner, Russell, & Lerman, 1978, p. 63).

In sum, a motivational sequence is initiated by an outcome. If the outcome is unexpected or important, a causal search is undertaken to determine why the outcome occurred. After the causal decision has been reached, expectancy of success in the future follows. Expectancy of success then affects the subsequent action.

Parents' Attributions of Children's Academic Performance

There are relatively few studies that focus on parents' attributions of their children's academic performance. Beckman (1976) investigated causal attributions of teachers and parents regarding children's performance. Nine upper elementary teachers were asked to list the children in their classes who fell into the following performance levels: highest 10%, middle 10%, and lowest 10%. The children's parents and the teachers then answered structured and open-ended questions regarding the reasons behind each child's performence. The list of factors on structured questions included child's ability, child's motivation, teacher's teaching, mother's influence, father's influence, peer's influence, and other reasons. Each item was rated on a five-point scale ranging from 1, of no importance, to 5, very important. Results from the parents showed that there were no significant differences in their ratings between the performance level of their children.

Cashmore (1980) investigated Australian children age 12 to 14 years and their parents. Participants were asked to indicate which of three attributions--talent, effort, or teaching--best explained why some people performed better than others for each of the following subjects: mathematics, science, writing, music, sports, and art. Although parents and children gave different answers depending on the subject matter, overall, parents viewed talent as the most important attribution, while children cited effort. Neither group felt teaching was of major importance.

Bar-Tal and Guttmann (1981) compared teachers', pupils', and parents' attributions for pupils' academic achievement. Subjects were asked to indicate the extent to which each of 10 listed causes influenced the achieved grade. The 10 causes were ability, interest, difficulty of material, effort, teacher's explanation, conditions of study at home, help given by parents, luck, diligence, and difficulty of exams. Results showed that parents attributed their children's success to home conditions and teacher's explanations, and failure to inappropriate home conditions and children's low level of interest and ability.

Holloway and Hess (1982) investigated the causal attributions given by mothers for their fifth- and sixth-grade children to explain their success in a school subject. Participants were asked to weight the importance of four attributions: ability, effort, personality, and training. Mothers cited children's ability as the main cause of success, while lack of effort was viewed as the main reason for failure. In addition, mothers of girls saw effort as more important in explaining low performance than did mothers of boys.

Stevenson (1983) conducted a cross-cultural study to investigate the reasons for children's academic achievement in the United States, Japan, and Taiwan. Parents' attributions of children's success were viewed as one of the important factors that explained why American children's academic achievement was far lower than that of their counterparts in Japan and Taiwan. His method was to ask mothers first to rank four factors--effort, natural ability, difficulty of schoolwork, and luck--in terms of their relative importance to children's achievement, and then to apportion 10 points to these factors. Rank orders of the importance of the items were the same in all three cultures. Effort was ranked first, followed in order by ability, task difficulty, and luck. However, the relative emphasis given to effort and ability differed significantly; Japanese and Taiwanese mothers ranked effort significantly higher than did American mothers.

Holloway and Hess (1985) compared mothers' and teachers' attributions of children's mathematics performance. Mothers were asked to distribute 10 chips to 5 causes according to the relative importance of each cause on children's mathematics achievement. Before apportioning the chips, mothers were required to indicate their children's performance as high or low performance in comparison with other children in the class. For the high performance condition, the following question was asked: "You have indicated that your child was doing better than other children in the class. Why do you think he/she was doing that well" (p. 181)? The causes provided to mothers included

> My child has a natural ability.
> My child tried hard.
> My child had good training in school.
> My child had good training at home.
> My child has been lucky. (p. 181)

An analogous procedure was used for low performance, however, the question was phrased "You have indicated that your child wasn't at the very top of the class. Why do you think he/she wasn't doing even better" (p. 181)? Results showed that mothers' attributions differed between children's high and low performance and between boys and girls. Mothers credited training at school and the child's effort as the first and second most important reasons for high performance. The child's ability was third, with training at home rated fourth, and luck was given very little weight. They cited lack of effort as the primary cause of low performance, with lack of ability second. Inadequate training in school and home were given moderate weight. Bad luck was not seen as important.

For boys, mothers attributed high performance in the following order: ability, training at school, effort and training at home. For girls, the following patterns emerged: training at school, effort, training at home, and ability. Mothers of boys believed that their children's low performance stemmed from the following reasons (in order of assigned importance): lack of effort, inadequate school training, lack of ability, and inadequate home training. For mothers of girls, the following order was reported: lack of ability, lack of effort, inadequate school training, and inadequate home training.

Hess et al. (1986) compared mothers' attributions of their children's academic achievement in Japan and the United States. The items used in Japan were ability, effort, training at school, material difficulty, and luck, while material was substituted by training at home in the United States research. Mothers were asked to distribute 10 chips to any of 5 sources of relative success or relative lack of success in the mathematics achievement of their fifth-grade children. There was a dramatic contrast between the two cultures. In Japan, poor performance was attributed to lack of effort; in the United States, explanations were more evenly divided among ability, effort, and training at school. Japanese mothers were less likely to blame training at school as a cause of their children's low achievement.

Stevenson and Lee (1990) conducted a follow-up interview after their initial study (Stevenson, 1983). Mothers from three cultures--the United States, Japan, and China--were asked to rate the influence various factors can have on academic performance, and this influence was measured by a 7-point scale from "not at all important (1)" to "extremely important (7)." Included in this list were studying hard, intelligence, study habits, a good teacher, home environment, parents' assistance, the curriculum, and luck. American mothers gave significantly lower ratings to effort than to study habits, a good teacher, home environment, or curriculum, whereas the only factor that Chinese and Japanese mothers considered more important than effort was a good teacher.

None of the correlations between mothers' ratings and their years of education were significant in Sendai (Japan), except for a slight tendency for better-educated mothers to give less emphasis to luck. In Taiwan, educational level was positively related to studying hard, a good teacher, and a good home environment. The pattern for American mothers was quite different. Those with more years of schooling tended to give lower ratings to all variables other than intelligence and luck, to which they gave higher ratings.

A number of interesting conclusions can be drawn. The focus of the studies was usually on the comparisons of attributions among various groups; either the ascriptions among students, teachers and parents, or the attributions among different cultures--the United States, Japan, and China. The methods used were mainly structured interviews, but questionnaire surveys were also included in some of the studies. When rating causes, two methods were adopted: one required participants to rate in a 5- or 7-point scale, the other asked subjects to distribute 10 points to a list of factors according to their judgement of the relative importance of each factor. The number of causal factors listed in the instrument varied from 3 to 10 items. However, both ability and effort were listed in all instruments. In addition, four other items were frequently included: teachers teaching (or training in school), parents help (or training at home), difficulty of task, and luck. Interestingly, results were often inconsistent.

Parents' Expectations and Children's Academic Performance

Expectations have been defined as "the cognitive orientational aspect of goal-directed behavior defined for a person by a significant other" (Haller, 1968, p. 484). Most investigators have defined parents' educational expectations in terms of years of schooling and occupation expected for their child, but some have added the prediction of present academic performance (Seginer, 1983). Some researchers make a distinction between aspirations and expectations. Although both are considered expressions of goals, aspirations are seen as more idealistic, whereas expectations are regarded as more realistic (Haller, 1968). Aspirations refer to goal choices without consideration of real-life constraints; expectations take into account practical constraints (Spenner & Featherman, 1978). However, a combination of both idealistic and realistic components may be better measure of parents' expectations of their children's education.

Boocock (1972) has identified parents' expectations as an important family characteristic that affects a child's academic performance and has noted that the higher the mother's educational expectations, the stronger her demands for high academic performance of her child. Conversely, the lower the expectations, the less her demands. He also concluded that high achieving children tended to come from families who had high expectations for them.

Early studies generally employed a one-shot bivariate model to investigate the relationship between parents' educational expectations and their children's academic performance. Woelfel and Haller (1971) investigated the relationship between significant others' expectations and academic performance of high school students. They used years of schooling and occupational expectations as measures of expectations and found a correlation of .23. Keeves (1972) examined parents' expectations and sixth graders' achievement in mathematics and science assessed one year later. Ambitions for child's future education and occupation were chosen to represent parents' expectations. Achievement in mathematics was moderately affected by mothers' ambitions for child (r = .52), while achievement in science was affected by the father's ambitions (r = .41).

St. John (1972) investigated mothers' expectations and the IQ and GPA of sixth graders. Expectations were represented by estimation of academic performance and years of schooling. St. John reported moderate correlations between mothers' expectations and child's IQ and GPA (for the white sample, .47 with IQ, .35 with GPA; for the black sample, .27 with IQ, .20 with GPA). Shipman, McKee, and Bridgeman (1976) investigated mothers' expectations and 9-year-old children's performance. Years of schooling and occupational expectations were used as measures. Expectations were moderately correlated with all measures of achievement (from .36 to .49).

Because the relationship between parents' expectations and children's academic achievement were thought to be clearly demonstrated, the effects of social class and child's sex on parents' expectations were also investigated. Rodman and Voydanoff (1978) found that low-income parents had high educational and occupational aspirations for their children. However, their expectations were lower. That is, their expectations were based more on the realistic situations. They posited that aspirations did not vary across social classes, but expectations were class related and were lower in the lower class than in the middle class.

Marcus and Corsini (1978) required parents to estimate their children's level of success on tasks. Before giving their own estimates, parents were told the below-average, average, and above-average performance levels for children. Results showed lower-class parents' expectations were significantly lower than those of middle-class parents. However, both lower- and middle-class parents' expectations were in the average range. Entwisle and Hayduk (1978) examined middle- and working-class parents' expectations for their first-grade children's reading, math, and conduct grades. They found that most parents predicted grades of B's for all three subjects. In the middle-class school, parents' expectations were reasonably accurate. However, in the working-class school, parents overestimated their children's grades, perhaps because their children's scores were so low that even an estimate of an average grade was too high. Entwisle and Hayduk (1981) later investigated academic expectations and the school attainment of young children. Parents were asked to rate the child's general ability to do school work compared to that of other children in the class and to guess the grade the child would receive.

They used these two indices to represent parents' expectations. The researchers found that parents formed their expectations for their child's performance on the basis of their impressions of their child's intelligence. These expectations were also tempered by the parents' consideration of their child's sex. Entwisle and Hayduk (1981) indicated that parents' expectations may influence the child's grades, which could come about either by direct socialization or by the parents' arranged home environment, or by both. For example, parents who hold high reading expectations may provide more books for their child.

Entwisle and Baker (1983) investigated parents' different expectations for boys and girls and found that middle-class and working-class parents differed in the pattern of their expectations for boys and girls in mathematics. Middle-class parents expected higher grades from boys, but working-class parents expected higher grades from girls, even though neither the boys nor the girls differed in their actual grades. Both working- and middle-class parents expected higher grades from girls than from boys in reading, and girls' reading grades were actually higher.

Seginer (1983) suggested another model to investigate the relationship between parents' expectations and children's academic achievement. In this model, parents' achievement-supporting behaviors were included as mediators between parents' expectations and children's outcomes. According to this model, Seginer (1986) investigated the relationship between mothers' expectations and behaviors and their sons' performance. For mothers' expectations, she stated

> Expectations were defined as consisting of three dimensions--realistic expectations, idealistic expectations, and standards of achievement--and were represented by the sum of three scores: estimate of son's grades on report card, wishes concerning his grades, and her standards of academic achievement. These were assessed by three questions: (a) "What grade do you want your child to receive in his final report card?" (b) "What grades do you in fact expect your child to receive in his final report card?" and (c) "What do you consider to be good/poor grade?" (p. 157)

Mothers' achievement-supporting behaviors were divided into _instigating_ behaviors and _responsive_ behaviors. "An instigating behavior is acting to create underlying conditions for the son's improved academic pursuit....A responsive behavior is reacting to an event concerning the son's academic performance" (p. 155). The instigating behaviors were represented by (a) information concerning child's academic performance programs, (b) additional contact with school or teacher, (c) supplementation of child's education through after-school programs, and (d) active engagement in mother's continuing education. The responsive behaviors were represented by positive reinforcement and punishment of academic performance and classroom behavior.

Results showed that mothers' educational expectations were strongly related to their sons' academic performance. Decomposing this effect into paths indicated that half of the relevant variance between expectations and achievement was attributable to specific maternal behaviors, including a positive relationship between achievement and reinforcement, a negative relationship between achievement and punishment, and additional contact with teachers. Similarly, effects of SES on academic achievement were found to decompose almost equally into a direct effect and an effect mediated by the mothers' educational expectations.

Seginer (1983) reviewed studies on parents' educational expectations and children's academic achievement and criticized the disadvantage of one-shot bivariate research. She stated

> The majority used a one-shot bivariate model which precluded the treatment of two issues: (a) parents' expectations as antecedents of their child's academic achievement, and (b) the effect that parents' expectations had on their child's academic performance relative to other dimensions of the home environment. (p. 4)

She provided a model of the course of parents educational expectations, including interrelationships among parents' expectations, their antecedents, the mediators through which expectations affect academic achievement, and the outcome of academic achievement. The antecedents were feedback from school, the parents' own aspirations, and parents' knowledge. The mediating factors were achievement-supporting behaviors, differential reinforcement, and the child's own aspiration. Seginer suggested that "future research in the area be devoted to the explication of the course of parents' educational expectations and the factors mediating between these expectations and the child's academic achievement" (p. 1).

General findings related to the investigation of parents' educational expectations were that (a) there were moderate correlations between parents' expectations and children's academic achievement, (b) years of schooling, estimation of academic performance, and occupational expectations were usually adopted as measures of parents' expectations, (c) parents' expectations were class related, and working-class expectations were lower than those of the middle-class; (d) parents' expectations differed for boys and girls, and parents had higher expectations for boys, especially in mathematics, and (e) parents' behaviors were the mediators of the relationship between expectations and children's academic performance.

Parents' Achievement-Supporting Behaviors

The term "parents' achievement-supporting behaviors" was used by Seginer (1983) in her review of relationships between parents' educational expectations and children's academic achievement. She stated that parents' achievement-supporting behaviors and differential reinforcement were mediators between expectations and achievement. Her examples of achievement-supporting behaviors included the interest and involvement that parents have in their child's learning and school activities and the extent to which parents act as models of learning and achievement for their child.

In early studies of family influences on children's cognitive outcomes, the term "family environment" was more often used. This included all the variables in a family that may affect children's outcomes. Parents' expectations and achievement-supporting behaviors were both components of family environment. Dave (1963) and Wolf (1964) explored the relationship between family environment and measures of academic achievement and intelligence, respectively. Both investigations used the same 60 children, 32 girls and 28 boys with an average age of 11. Wolf identified three press variables postulated to be related to the intelligence scores. Each was represented by four to five process characteristics and were labeled (a) press for achievement (e.g., nature of intellectual aspirations for child), (b) press for language development (e.g., quality of language models available), and (c) provisions for general learning (e.g., opportunities provided for learning in the home, and outside the home, availability and encouragement of use of books, periodicals, and library facilities). Results showed that the three press variables accounted for 49% of the variance in the intelligence test scores.

Dave (1963) identified six press variables, defined by 21 process characteristics, as the educational environment of the family. They were (a) achievement press--the goals and aspirations parents hold for themselves and for the children, (b) languages model-- the quality of the parents' own language, (c) academic guidance--the amount and quality of guidance provided by parents on matters related to schoolwork, (d) activeness of family--the number and use of books, magazines, and other reading materials, (e) intellectuality in the home--such things as the kinds of toys and games with which the child plays, and (f) work habits in the family--degree of structure and routine in the home management. Dave's press variables account for 53% of the variance in arithmetic problem solving, 50% in reading, 37% in spelling, and 31% in arithmetic computation.

In England, Plowden (1967) investigated five parent socialization variables: (a) responsibility and initiative taken by parents over child's education--whether parents asked teachers for work for child to do or how to help the child at home, (b) parents' interest and support--whether parents do things with the child at weekends, (c) literacy of the home--number of books in the home, (d) relations between parents and teachers--whether parents were happy with the arrangements for seeing teachers, and (e) educational and occupational aspirations--parents want child to stay on at school, to attend university. Correlations between total family environment and child's reading score were .44 to .57 for girls, and .45 to .67 for boys (the differences were between junior, middle, and senior age cohorts).

Also in England, Majoribanks (1976) used factor scaling to construct environment press variables, which he labeled parents' aspirations for child, literacy of home, parents' interest and support in child's education, responsibility and initiative taken by parents in relation to child's schooling, relations between parents and teachers, parents' time to do things with child, interest in helping with schoolwork, parents' belief in value of school, satisfaction with present school, child's viewing of television, and parents' knowledge of child's schoolwork. He reported that family environment measures accounted for 20% of the variance in both English and mathematics achievement scores for boys and 24% for girls but accounted for less than 10% in the intelligence test scores for both boys and girls.

Another Majoribanks' (1977, as cited in Majoribanks, 1979a) study collected data from Australian urban families, each with an 11-year-old child attending elementary school. Among the variables used to define the family environment were parents' educational and occupational aspirations for their children, the language environment of the family, press for independence, individual-collective value orientations of the parents, and parents' satisfaction with the teaching in their child's school. Environment variables had low to moderate correlations with the academic achievement scores (.39 with reading, .23 with mathematics), and negligible to low correlations with intelligence (.16 with Raven's score). There was only a slight difference between boys and girls in correlations with intelligence (.16 for boys, .19 for girls).

Majoribanks (1979a) concluded that

> In general, the findings show that the environment measures have moderate to high relations to verbal performance scores, moderate associations with mathematics achievement, and lower relations to non-verbal intelligence scores. (p. 45)

One should note that in previous studies a very large number of family environment variables were found to contribute to children's cognitive outcomes. Among them, parents' expectations and aspirations for their children's education were most often emphasized as important contributors.

Three Components Model

The preceding studies investigated the relationship between family environment and children's academic performance. All were based on a one-shot bivariate model which "...precluded the effect that parents' expectations had on their child's academic performance relative to other dimensions of the home environment" (Seginer, 1983, p. 4).

Seginer separated parents' educational expectations from other family environmental variables and used the term achievement-supporting behaviors to include those variables contributing to children's academic performance, excluding parents' expectations. She considered that parents' supporting behaviors were mediators between parents' expectations and child's achievement.

Later, Seginer (1986), based on her model of the course of parents' educational expectations, investigated mothers' expectations and behaviors and their sons' performance. The results showed that mothers' responsive behaviors were a stronger mediator between expectations and their children's academic performance than were mothers' instigating behaviors. Seginer's research was a three-component-model that included parents' beliefs, parents' practices, and child outcomes.

Johnson and Martin (1985) conducted another three-component-model research. They studied the effects on children's cognitive development of their parents' beliefs and home learning environments. Parents' beliefs focused on communication with children and child development. The variables of home environment were adapted from Majoribanks' (1979a) family environment interview schedule and included parents' aspirations for the child, parents' reinforcement of aspirations, family involvement in educational activities, and press of independence. Results showed that

(a) family SES correlated significantly with certain beliefs, family environmental press, and child performance measures, (b) parents' belief measures correlated with child performance, (c) family environment variables correlated with parent beliefs, and (d) child performance correlated with family environment press.

This general three-component-model approach may provide information that will contribute to "...a fuller understanding of the role of parents' beliefs as they affect parental practices and child outcomes" (Johnson & Martin, 1985, p. 40).

Variables of Parents' Achievement-Supporting Behaviors

Many family process variables have been investigated in early studies of the relationship between family environment and children's school-related outcomes reviewed in the preceding section. In Majoribanks' (1976, 1979a) family environment interview schedules, time for homework and television, books and encyclopedia owned by family, and lessons outside of school were included as parts of environment press variables. However, Majoribanks focused on the global environment and did not attempt to analyze individual items. Stevenson (1983) and Stevenson and Lee (1990) added tutoring and treatment of academic performance, along with other variables, in their cross-cultural research. These variables were assumed to be related to parents' attributions and expectations and emphasized by

Chinese parents in improving their children's academic achievement and, thus, selected to represent parents' achievement-supporting behaviors in this study.

Among these variables, kinds and number of books, magazines, and encyclopedia have long been considered important factors contributing to a child's learning (Campbell, 1951, as cited in Miller, 1971). In addition, Seginer (1986) investigated the use of supplementary lessons outside of school and treatment of academic performance.

Homework and television time are also variables that have received considerable attention recently. The number of hours of homework per week was substantially related to achievement (Wolf, 1979; Walberg, Paschal, & Weinstein, 1985). Homework has usually been defined as the assignment required by classroom teachers for children to complete at home, but Keith (1982) defined it as "the amount of time a student spends studying outside of class" (p. 248). Based on this definition, Keith conducted a large-sample path analysis and found that study time contributed significantly to high school students' grades; its direct effect was second only to that of intellectual ability. Keith and Page (1985) suggested that more able students do more homework than less able ones. They further indicated that increased homework time resulted in higher achievement for all levels of ability. They added that "homework also seems to have compensatory effects" (Keith & Page, 1985, p. 351).

Students of lower ability can achieve grades commensurate with their brighter peers through increased study. This is generally believed by Taiwanese parents (Chen & Stevenson, 1989). Recently, a cross-cultural examination of homework in the United States, Japan, and China (Chen & Stevenson, 1989) found that (a) the amount of homework done per week by fifth graders was 304 minutes in Minneapolis (USA), 362 minutes in Sendai (Japan), and 585 minutes in Taipei (Taiwan), and (b) in the comparisons between cultures, time spent on homework appeared to be positively related to children's academic success. There were, however, no significant correlations between time and achievement within cultures.

With regards to the influence of television, the majority of studies have found a negative association between number of hours of televiewing and level of academic achievement (Hornik, 1981; Keith, Reimers, Fehrmann, Pottebaum, & Aubey, 1986; Walberg, 1984; Williams, Haertel, Haertel, & Walberg, 1982). In particular, when students beyond the fourth grade were tested, hours of television watching was negatively associated with achievement (Hornik, 1981). Some researchers have cautioned that it is necessary to recognize the existence of rival hypotheses in the interpretation of the relationship between television watching and cognitive outcomes. IQ and social class have surfaced as the possible rival interpretations. Foremost is the possibility that IQ is the true cause of both televiewing and academic performance. For example, Ridley-Johnson, Cooper, and Chance (1982) found that more television watching was associated with lower grades in reading and lower IQ. Morgan and Gross (1981) found that when IQ was controlled their correlations in the range of -.20 fell to nearly zero for the television viewing and mathematics or language associations. Social class may have similar effects on both variables. It was found that the relationship between television viewing and achievement minimized within social class subgroups except for the children of professional workers; for the children of professional workers, there was significant negative relationship between the time of watching television and achievement (California State Department of Education, 1980).

Walberg (1984) concluded that increasing supervised homework and reducing televiewing improved children's academic achievement. Keith, Reimers, Fehrmann, Pottebaum, and Aubey (1986) stated that homework time had a significant, positive effect on student achievement (path = .141), while TV time had a smaller, negative effect (path = -.056).

Effects of Socioeconomic Status

Socioeconomic status (SES) has been considered to have a strong influence on children's school performance and thus has been included often as one of the important variables in the investigation of children's school achievement. Boocock (1980) indicated

> The family characteristic that is the most powerful predictor of school performance is SES: the higher the SES of the student's family, the higher his or her academic achievement. This relationship has been documented in countless studies and seems to hold no matter what measure of status is used (for example, occupation of principal breadwinner, family income, parents' education, or some combination of these). It holds, moreover, even when the powerful variables of ability and past achievement are controlled. (p. 40)

Plowden (1967) found that the correlations between SES indicators and academic achievement ranged from .20 to .36, and between SES and intelligence from .10 to .27. Sewell and Hauser (1976) found that there were large differences in the educational attainments among SES groups. But SES had no effect on grades independent of academic ability, it had strong direct and indirect effects on significant others' (parents, peers, and teachers) influence and educational aspirations, and, through these, on educational attainments. Combining these effects, SES accounted for 54% of the variance of educational achievement.

After examining the correlations of child outcomes and SES and family environment of Plowden's (1967) survey, Majoribanks (1979a) suggested that SES may have two separate influences on achievement scores: "First, a 'contextual effect' mediated through the family environment, and second, an 'individual effect' assessed by the direct effects of SES on outcomes" (p. 64). Bradley, Caldwell, and Elardo (1977) made a comparison between an environmental process measure and SES measures in terms of their relations with the young child's IQ. Results showed that the environmental process measures predicted IQ better than did SES. Among the SES variables, the educational level of parents demonstrated the strongest relationship to children's IQ. Shipman, McKee, and Bridgeman (1976) found SES and process variables shared considerable commonality in their prediction of the child's subsequent reading, mathematics, and Raven performance. They suggested that the process variables helped provide important explanatory information about SES. Majoribanks (1982) found that SES and family environment were associated with a moderate influence on word performance, with a relatively lower influence on mathematics achievement. SES contributed more to the academic achievement of girls than to that of boys. And the unique contribution of family environment on academic scores was relatively small when compared to the contribution of SES. Jan-Eric and Allan (1982) found SES had a strong effect on children's academic achievement. This effect was stronger with respect to school achievement and verbal ability than with respect to non-verbal ability. They indicated that father's education level is likely to be a strong determination of the child's verbal achievement.

Apparently, it has been demonstrated that SES had significant effect on children's academic achievement. This effect included a direct effect and an indirect effect mediated by child's ability and family environment. SES and associated environment processes had more effect on children's reading achievement than on mathematics achievement.

In the measure of SES, Plowden's survey used three indicators: father education, father occupation, and family income. Sewell and Hauser (1976) used a weighted index composed of father's education, mother's education, parental income, and father's occupation. Usually, these indicators of SES were highly correlated with each other. In the investigation of SES effects on children's school-related outcomes, if a single indicator is to be used to represent SES, fathers' educational level may be the most significant. Laosa (1982) indicated that the educational level of parents was probably the most basic variable for predicting student achievement because it was linked to parents' interest in and attitudes toward education. Parents' beliefs, behaviors, and children's cognitive performance were each likely to be related to the educational status of the parents. It is not surprising, then, that McGillicuddy-De Lisi (1985) suggested that the effect of parents' level of education on child outcomes was an important one to investigate.

Effects of Child's IQ

Child's IQ has been demonstrated to have a strong relationship to child's school achievement. Corno and Snow (1986) noted that "intercorrelations among intelligence measures and school achievement measures are significantly positive and often quite high all along the age range" (p. 616).

Majoribanks (1976) found that the correlations between intelligence and English achievement was .51; between intelligence and mathematics achievement was .60. When SES, IQ, and children's outcome were included in the same analyses, however, findings have been inconsistent. Some studies (Sewell & Hauser, 1975; Williams, 1976) have shown that SES measures have little or no influence on the academic performance of students of equal intellectual ability, while Banks (1976), in a review of the literature, concluded that there was a great deal of evidence that SES had a considerable effect on academic achievement when measured ability was controlled. Majoribanks (1979b) examined correlations between intelligence and academic achievement at different SES levels. He found that the achievement scores including English and mathematics had stronger relations with the intelligence scores than with SES. Glossop, Appleyard, and Roberts (1979) found that students from poorer social backgrounds obtained lower achievement scores in both reading and mathematics relative to their intelligence scores, and boys tended to obtain lower scores than girls except in mathematics where there were no significant sex differences. Maqsud (1983) found both SES and intelligence had significant positive effects on academic achievement. Apparently, child's IQ had a significant effect on school achievement, but it was intercorrelated with sex and SES in its influence on children's performance.

Sex Differences

Child's sex is another demographic variable that has been concerned frequently in the investigation of family influences. The purpose has generally been to answer the question of whether boys or girls were more susceptible to environmental influences, as well as to investigate different treatments by parents for boys and girls.

Maccoby and Jacklin's (1974) comprehensive review of the psychological differences between the sexes found that girls were superior to boys in verbal abilities, but this superiority was not consistent until about the age of 11. Boys, however, were superior to girls in mathematical skills, although this superiority does not usually appear until the age of 12 or 13. But recent research (Skaalvik, 1990) found that in sixth-grade Norwegian students, girls had a substantially higher level of achievement and higher success expectations than their male classmates in Norwegian and English tasks, whereas there were no gender differences in achievement or success expectations in mathematics.

Much attention has been given to expectancy of success, which seems to cross many areas of achievement. An early study (Baumrind, 1972) indicated that parents usually have lower achievement aspirations for girls than boys. Affected by parents' lower expectations, girls tend to have a lower expectancy of success, lower levels of aspiration, and are more likely to accept failure than boys (Parsons, Ruble, Hodges, & Small, 1976; Stein & Bailey, 1973). However, recent research (Berndt & Miller, 1990) found that boys and girls had similar expectancies of achievement and boys appeared to value academic success less than did girls. Girls were also more likely to attribute failure to their own inability, and success to external causes, while boys were more likely to assign success to ability and failure to external causes (Dweck, 1975; Parsons, 1983). In addition, boys more often than girls were encouraged to compete and were threatened with punishment (Huston, 1983). Parents value achievement in mathematics less and have lower estimates of competence in math for their daughters than for their sons (Parsons, 1983; Parsons, Adler, & Kaczala, 1982). "Although parents value intellectual accomplishment and academic achievement for both sexes, they have higher expectations and standards for their sons' long-range achievement than for that of their daughters" (Huston, 1983, p. 430).

In sum, early studies usually concluded that there were significant sex differences in achievement, expectations, and attributions, and assumed that these differences were caused by parent's differential treatment of boys and girls. With society changing to sex equality, the evidence of sex differences in many areas has disappeared, decreased or has even reversed. However, sex differences are still a variable of much concern in educational research.

Ethnic and Cultural Effects

Investigating the relationship between sets of predictors and cognitive performance, Walberg and Majoribanks (1976) suggested that "correlational or causal relationships established for one group may not hold for other times, social classes, ethnic groups, or countries" (p. 527). Majoribanks (1979a) investigated the relationship between ethnicity, family environment, intelligence, and academic achievement in Australian children and found that there were differential ethnic group relationships between family environment measures and academic achievement at different levels of intellectual ability. For the Anglo-Australian children, both intelligence and family environment scores had significant associations with achievement, but for Greek-Australian children academic achievement was not related to the family environment of children with equal intellectual ability. He suggested that "there were significant differences in the socialization processes operating within different ethnic groups to affect academic achievement" (p. 175). In essence, ethnicity is a significant variable that must be taken into account when examining the relationship between family environment and children's school-related characteristics.

Stevenson and Lee (1990) examined variables that included time for play, television, reading for pleasure, homework, after-school classes, and tutoring. They found that Chinese children spend less time on play (8.1 hours a week), television (10.6 hours a week), and reading for pleasure (4.8 hours a week) than Japanese or American children but more time on homework (12.9 hours a week). Also, a lower percent of Chinese children enrolled in nonacademic after-school classes. Stevenson and Lee (1990) noted that "it seems reasonable to conclude that Chinese children were the most likely to engage in academic activities after school" (p.44).

Ghuman and Wong (1989) used Chinese families in England as subjects and obtained results similar to Stevenson. Thirty-four Chinese families from Manchester were interviewed about the education and schooling of the children. Parents placed a very high value on education and homework for their children, and did not like them spending much time watching television. Au & Harackiewicz (1986) reported that Chinese children care very much about their parents' evaluations; more than children from other cultures.

Summary

In this chapter the researcher first introduced Weiner's attributional theory, then reviewed a number of studies of parents' attributions of their children's academic performance and examined studies and models of parents' educational expectations, finally investigating the relationship between parents' achievement-supporting behaviors and children's academic achievement. Weiner indicated that a search for causes of an important outcome was a primary motivator of action. Academic achievement is no doubt an important outcome for most children and their parents.

Ability and effort have been the major attributions identified to explain the successful or unsuccessful academic performance of children. The property of attributions falls into three dimensions: locus of causality, stability, and controllability. If parents ascribe their children's academic performance to causes which are stable and uncontrollable, such as ability, they may expect that the same result will occur in the future. In contrast, if the attributions were unstable and controllable, parents may not expect that the same result will occur. Effort was an unstable attribution in situations of failure, but tended to be perceived as relatively stable in success. Therefore, if academic performance is ascribed to effort, one may always have high expectancy of success in the future in spite of success or failure. If, however, academic performance was attributed to ability, the expectancy of success in the future will decrease with failure.

Based on Weiner's attributional theory, a number of researchers have investigated parents' attributions of their children's academic performance. The main findings have included: (a) the items of causality differed among studies, but ability and effort were used in all studies, and teachers' teaching, parents' help, difficulty of task, and luck were included in most studies, (b) in the rating of weight of attributions, in addition to using conventional five- or seven-point scale for subjects to rate each item, the distribution of 10 points to a list of four or five items was used effectively, and (c) results have been inconsistent among studies, and the effects of child's sex, IQ, and parents' education on attributions have been unclear.

Parents' educational expectations were demonstrated to have moderate correlations with children's academic achievement. Most investigators defined parents' expectations in terms of years of schooling expected for their child, but in some, prediction of present academic performance was also included. Although some researchers distinguished aspirations from expectations and viewed aspirations as idealistic and expectations as realistic, a combination of both components was used in most studies to represent expectations. Studies in this area usually investigated the difference of expectations between social classes and between boys and girls. Major findings were that (a) expectations were class related--working class was lower than middle-class, (b) expectations differed for boys and girls--parents had higher expectations for boys in mathematics, c) expectations were usually on the basis of the child's IQ, and (d) parents' behaviors were the mediators of the relationship between expectations and children's performance. It was suggested that future studies investigate the interrelations among parents' expectations, their antecedents, the mediators through which expectations affect achievement, and the children's achievement.

The term "parents' achievement-supporting behaviors" was used by Seginer (1983) after she separated parents' expectations from other family environmental variables. In early studies of correlations between family environment and children's academic performance, parents' expectations and a variety of processes variables were combined into a global family environment, and the results showed that the environment measures had: (a) a moderate to high relationship with verbal performance, (b) moderate associations with mathematics achievement, and (c) a lower relationship with non-verbal intelligence scores. Family environment and the relationships between family environment and children's academic performance, however, were somewhat affected by SES, child's sex and IQ, and ethnicity.

Because expectations were separated from other family variables, it was assumed that parents' achievement-supporting behaviors were mediators between parents' expectations and children's academic achievement. Thus, a three-component-model approach--parents' beliefs, parents' practices, and children's outcomes--was suggested for use in the study of family influences. This kind of research may contribute to a fuller understanding of the role of parents' beliefs as they affect parents' practices and children's performance, and the interrelations among these variables.

CHAPTER III
METHODOLOGY

The purpose of this study is to investigate the attributions, expectations, and achievement-supporting behaviors of Taiwanese parents. Specifically, this study analyzes the differences in these variables for fathers with different educational levels, with male and female children, and explores the causal relationships among these variables and their children's academic achievement. The hypotheses, population and sample, instruments, data collection procedures, and data analysis are presented in this chapter.

Hypotheses

For this study, the following hypotheses will be examined.

1. There is no significant relationship between parents' attributions of children's academic performance and
    a. father's educational level,
    b. child's sex,
    c. child's IQ, and
    d. child's academic achievement.

2. There is no significant relationship between parents' expectations of their children's education and

    a. father's educational level,
    b. child's sex,
    c. child's IQ, and
    d. parents' attribution of effort.

3. There is no significant relationship between parents' achievement-supporting behaviors and

    a. father's educational level,
    b. child's sex,
    c. child's IQ,
    d. parents' attribution of effort, and
    e. parents' expectations.

4. There is no significant relationship between children's academic achievement and

    a. father's educational level,
    b. child's sex,
    c. child's IQ,
    d. parents' expectations, and
    e. parents' achievement-supporting behaviors.

Population and Sample

Subjects for this study were selected from residents in the midwest area of Taiwan, a country composed of seven cities and 16 counties with a population of approximately 20 million people. One city and three counties, with a population of nearly 3.5 million, are located in the midwest. In this area, 498 elementary schools provide education for some 474,000 children. For this study, a sample of 554 sixth-grade students and their parents were selected according to the following procedures:

1. Lists of schools were stratified into three levels according to location and number of classes within a school in order to reflect the socioeconomic status of families.
2. One school was randomly selected from each level in each city and county, providing a total of 12 schools.
3. One 6th-grade class was randomly selected from each of the 12 schools.
4. All students in the selected classes, and their parents, were the subjects of this study. Consequently, a total of 554 students and their parents composed the total sample.

Instrumentation

A questionnaire was used to gather data on parents' attributions, expectations, and achievement-supporting behaviors. A standardized mathematics achievement test and a standardized reading (Chinese) achievement test were selected to measure children's achievement. In addition, the Standard Progressive Matrices Test was used to measure children's IQ.

Questionnaire of Parents' Beliefs and Practices Toward Their Child's Education

This questionnaire (Appendix), adapted from the Parents' Interview Questionnaire used by Stevenson (1983) and Stevenson and Lee (1990), includes demographic information and consists of 14 items intended to identify the attributions, expectations, and achievement-supporting behaviors of the parents in the sample. Stevenson conducted cross-national studies of America, Japan, and China (Taiwan) and constructed both English and Chinese versions of his questionnaire, which included many more items than those selected by this researcher. Therefore, two pretests were administered to examine the appropriateness of the revisions. The first pretest was administered to 12 mothers by an interview, and a revision followed in order to make the sentences clearer and more easily understood by parents. After a month, a second pretest was administered to 52 parents, including the 12 mothers involved in the first pretest. The questionnaire was distributed to students through their classroom teacher, and the students were instructed to take it home to be filled out by their parents. Results showed that the items and procedures were both effective for purposes of the study.

Four items were used to measure parents' expectations:

(a) How much schooling do you wish your child to have?

(b) How much schooling do you estimate your child will be able to receive? (c) How well do you wish your child to achieve if the average score of a 6th-grade academic test is 75? and (d) How well do you estimate your child will be able to achieve if the average score of a 6th-grade academic test is 75? Each item had five choices worth from one to five points. The total points of these items represented the parents' educational expectations.

Attributions were measured by asking parents to respond to the following sentences: "There are many causes that contribute to a child's academic achievement, such as child's ability, teacher's teaching, luck, child's effort, and parents' help; which is the most important cause for your 6th-grade child's academic achievement? Which is the second? the third? the fourth? and the fifth? If there are a total of 10 points to be distributed to these five causes according to the importance of each cause, what's your distribution?

Items such as "How much time a day does your child do homework assigned by the teacher?" were included to measure parents' achievement-supporting behaviors.

Standardized Mathematics Achievement Test

The Elementary School Mathematics Achievement Test, developed by the Taiwan Provincial Teacher's Study Institute in 1986, was used to measure children's mathematics achievement. This test consists of 50 items for a possible

100 points. Its test-retest reliability coefficient is .88 between two weeks, split-half reliability coefficient .90; the concurrent validity coefficient with the total points in math class earned during a semester by elementary students as criterion was measured as .79. Test time is 60 minutes.

Standardized Reading Achievement Test

The Reading Achievement Test, an individual standardized test developed by the National Taiwan Normal University in 1984, was revised and adapted to group administration for this study. The original test is composed of 8 subtests with 130 items and a total score of 147. Its test-retest reliability coefficient is .87 between two weeks. The concurrent validity coefficient with the total points in reading class earned during a semester by sixth-grade students as criterion was measured as .64.

The revised version used in this study omitted 25 items intended to measure listening comprehension that could not be employed in a group administration. The total revised number of items was 105 with a possible score of 122. Its test-retest reliability coefficient was .92 between two weeks (n = 80), and concurrent validity coefficient was .84. The test time is 40 minutes.

Standard Progressive Matrices

The SPM was developed in 1938 by J. C. Raven and was introduced to Taiwan in 1958. It consists of 60 items, one point for each item. Its test-retest reliability coefficient is .87 between three months; the split-half reliability coefficient is .98. The correlation coefficient with academic achievement is .53. Generally, this group administered test can be finished within 40 minutes.

Data Collection

Data collected for this study include (a) parents' attributions, expectations, and achievement-supporting behaviors and (b) students' scores of achievement and IQ. Data collection procedures were as follows

Distribution and Collection of Questionnaire

The questionnaire of parents' beliefs and practices was distributed and collected through the children's classroom teacher, who was asked to distribute one questionnaire to each child. All children were carefully instructed to take it home and have their parents complete it and to return it within four days. Children who failed to return them on time were reminded after four days. There were 554 questionnaires distributed and 529 returned. Because a number of them were not filled out completely, only 440 were considered suitable for data analysis.

Administration of Tests to Students

A detailed schedule of administration of achievement and IQ tests was arranged and sent to all selected schools and classes. All three tests were administered during the same session, and a half day was needed to complete the tests in each school. The children were given a 10-minute break after each test. All tests were administered by the researcher to ensure standard procedures.

Data Analyses

Two procedures were used to analyze the data. First, analysis of covariance (ANCOVA) was performed to compare the mean scores of fathers with different educational levels and with male and female children. The dependent variables were parents' attributions, expectations, and achievement-supporting behaviors. The covariates for parents' attributions were child's IQ and academic achievement, for parents' expectations were child's IQ and parents' attribution of effort, and for parents' achievement-supporting behaviors were child's IQ, parent's attribution of effort, and parents' expectations. A multiple regression analysis was performed. If the effect of covariates was significant, adjusted means were computed. The research design (2x4 ANCOVA) is illustrated below:

Sex of child	Educational level of Father
Male	Elementary school or less
	Junior high school
	Senior high school
	Higher Education
Female	Elementary school and below
	Junior high school
	Senior high school
	Higher Education

The dependent variables are

1. Parents' Attributions,
2. Parents' Expectations, and
3. Parents' Achievement-Supporting Behaviors.

Second, a path analysis was performed to explore causal relationships among children's academic achievement and parents' attributions, expectations, and achievement-supporting behaviors. In this path model (see Figure 1, p. 9), father's education, child's sex, and child's IQ were included as exogenous variables. Four criteria were followed in the analysis: (a) the effort attribution was used to represent parents' attributions (the attribution of effort was demonstrated the most important cause for children's academic achievement by Stevenson), (b) a factor analysis was performed on variables of parents' achievement-supporting behaviors before path analysis, (c) children's mathematics and reading achievement scores were analyzed separately, and (d) all scores were converted to z scores in order to compute the path coefficients.

CHAPTER IV
RESULTS

The purpose of this study was to investigate the attributions, expectations, and achievement-supporting behaviors of Taiwanese parents. The differences of these values among father's educational levels and between boys and girls were examined and the relationship among these variables and children's academic achievement was explored.

Data were collected from sixth-grade students and their parents in 12 randomly selected elementary schools. The questionnaire was distributed to 554 parents, of which 529 were returned. Because a number of them were not filled out completely, only 440 were considered suitable for data analysis, amounting about 80%. Of the 440 questionnaires, 213 were from parents of male students, 227 from parents of female students. For the father's educational level, 158 completed elementary school or less, 93 completed junior high school, 135 completed senior higher school, and 54 received higher education. Information on the respondents is summarized in Table 1. The selected 554 sixth-grade students were given the Elementary School Mathematics Achievement Test, the Reading Achievement Test, and the Standard Progressive Matrices Test. The results presented in this chapter are based on the data from the 440 questionnaires and the student's scores on the tests. The means and standard deviations of variables of these 440 subjects are presented in Table 2. The data analysis included a 2x4 analysis of covariance to examine the differences between father's educational level and child sex, and a path analysis to explore the relationship among parents' attributions, expectations, achievement-supporting behaviors, and children's academic achievement.

Table 1

Frequencies of Respondents, Father's Educational Level and Child's Sex

Father's Education Level	Child's Sex	Frequency	Percent
Elementary School (Elem.)	Male	68	15.5
	Female	90	20.4
	Total	158	35.9
Junior High School (Jr. Hi.)	Male	54	12.3
	Female	39	8.9
	Total	93	21.1
Senior High School (Sr. Hi.)	Male	72	16.4
	Female	63	14.3
	Total	135	30.7
Higher Education (Hi. Ed.)	Male	23	5.2
	Female	31	7.0
	Total	54	12.3
Total	Male	217	49.3
	Female	223	50.7
	Total	440	100.0

Table 2

Means and Standard Deviations of Variables of 440 Respondents

Variable	Mean	SD
Parents' Attribution of Child's Effort	3.00	1.14
Parents' Attribution of Child's Ability	2.06	0.89
Parents' Attribution of Parents' Help	1.63	0.69
Parents' Attribution of Teachers' Teaching	2.63	0.92
Parents' Attribution of Luck	0.68	0.63
Parents' Expectations	14.35	3.22
Time for Homework	8.77	3.93
Time for Additional Study	5.09	3.72
Time for Watching Television	14.18	5.97
Time for Tutoring of Academic Subjects	1.29	2.04
Time for Supplementary Lessons	1.14	1.97
Number of Supplementary Lessons	1.31	1.68
Resources for Learning	2.65	1.30
Treatment of Poor Performance by Help	5.71	2.05
Treatment of Poor Performance by Punishment	4.70	1.51
Score of Standard Progressive Matrices	41.15	7.59
Mathematics Achievement	55.46	20.78
Reading Achievement	91.10	20.45

Parents' Attributions

Hypothesis 1 stated that there is no significant relationship between parents' attributions of children's academic performance and

a. father's educational level,

b. child's sex,

c. child's IQ, and

d. child's academic achievement.

Five items were sampled for parents' attributions. The parents distributed a total of 10 points according to the relative importance of each item. The items were: child's ability, teacher's teaching, luck, child's effort, and parents' help.

The means and standard deviations for each of the attribution items for child's sex and father's educational level are presented in Table 3. The results of an ANCOVA with child's IQ (Raven score) and academic achievement (mathematics & reading scores) as covariates for each of the five attribution items are summarized in Table 4--child's effort, Table 5--child's ability, Table 6--teacher's teaching, Table 7--parent's help, and Table 8--luck. Examination of each of these tables indicates that there were neither significant differences for the interaction of father's educational level and child's sex nor significant differences for any of the main effects. Hypothesis 1 can not be rejected on the basis of these findings.

Table 3

Means and Standard Deviations for Parents' Attributions for Male and Female Children and Father's Educational Level

		Father's Educational Level				
Attribution	Sex	Elem.	Jr. Hi.	Sr. Hi.	Hi. Ed.	Total
Child's Effort	M	2.76	2.96	3.18	3.30	3.01
		(1.16)	(0.97)	(1.30)	(1.15)	(1.18)
	F	2.79	2.97	3.25	3.10	3.00
		(0.94)	(1.14)	(1.33)	(0.87)	(1.10)
Child's Ability	M	2.14	2.21	1.98	1.98	2.09
		(0.93)	(0.90)	(0.80)	(0.68)	(0.86)
	F	2.15	1.85	1.88	2.21	2.03
		(0.94)	(0.87)	(0.89)	(0.96)	(0.93)
Teacher's Teaching	M	2.66	2.56	2.43	2.50	2.54
		(1.08)	(1.00)	(0.84)	(0.89)	(0.96)
	F	2.79	2.62	2.67	2.73	2.72
		(0.95)	(0.85)	(0.90)	(0.71)	(0.88)
Parent's Help	M	1.76	1.60	1.66	1.65	1.68
		(0.88)	(0.62)	(0.65)	(0.70)	(0.73)
	F	1.58	1.67	1.58	1.48	1.58
		(0.61)	(0.62)	(0.73)	(0.63)	(0.65)
Luck	M	0.68	0.69	0.75	0.48	0.68
		(0.73)	(0.48)	(0.74)	(0.49)	(0.66)
	F	0.68	0.90	0.60	0.56	0.67
		(0.65)	(0.64)	(0.48)	(0.52)	(0.60)

The rank order of the average points assigned to each of the five attribution items was as follows: child's effort (3.00) was first, followed by teacher's teaching (2.63), child's ability (2.06), and parent's help (1.62). The attribution of luck was negligible with a mean rating of 0.68. While there were no significant differences in parent's attribution ratings for any of the five items by the use of ANCOVA in which child's IQ, mathematics achievement, and reading achievement were used as covariates, examination of Table 3 indicates that as level of father's education increased, ranking of effort also increased for both the male and female children.

Results of a path analysis in which child's effort was used to represent parents' attributions are presented in Figure 2 and Figure 3. They showed, when mathematics achievement and reading achievement were put into the analysis separately, there was a small influence from father's educational level to parent's attributions (path coe. = .11, $p < .05$), but influences from all other variables were nonsignificant ($p > .05$). Altogether, the model accounts for only 2% of the variance of parents' attributions of child's effort.

Table 4

Analysis of Covariance for Parents' Attributions of Child's Effort

Source	DF	SS	MS	F	PR > F
Model	10	20.98	2.10	1.65	.090
Error	429	545.50	1.27		
Corrected Total	439	566.48			
Child's IQ	1	0.72		0.57	.453
Mathematics	1	0.89		0.70	.404
Reading	1	0.02		0.01	.906
Father's Education	3	9.46		2.48	.061
Child's Sex	1	0.04		0.03	.867
FED x Sex	3	0.98		0.26	.857

Table 5

Analysis of Covariance for Parents' Attributions of Child's Ability

Source	DF	SS	MS	F	PR > F
Model	10	8.21	0.82	1.03	.415
Error	429	341.07	0.80		
Corrected Total	439	349.27			
Child's IQ	1	0.16		0.21	.651
Mathematics	1	0.00		0.00	.986
Reading	1	0.12		0.15	.699
Father's Education	3	2.63		1.10	.348
Child's Sex	1	0.18		0.22	.638
FED x Sex	3	3.75		1.57	.195

Table 6

Analysis of Covariance for Parents' Attributions of Teacher's Teaching

Source	DF	SS	MS	F	PR > F
Model	10	6.98	0.70	0.81	.617
Error	429	368.63	0.86		
Corrected Total	439	375.62			
Child's IQ	1	0.06		0.07	.792
Mathematics	1	0.38		0.45	.504
Reading	1	0.58		0.67	.413
Father's Education	3	2.64		1.03	.381
Child's Sex	1	1.63		1.90	.169
FED x Sex	3	0.60		0.23	.873

Table 7

Analysis of Covariance for Parents' Attributions of Parents' Help

Source	DF	SS	MS	F	PR > F
Model	10	3.06	0.31	0.64	.782
Error	429	206.06	0.48		
Corrected Total	439	209.12			
Child's IQ	1	0.35		0.73	.393
Mathematics	1	0.13		0.26	.608
Reading	1	0.21		0.43	.511
Father's Education	3	0.17		0.12	.950
Child's Sex	1	0.66		1.36	.243
FED x Sex	3	0.82		0.57	.637

Table 8

Analysis of Covariance for Parents' Attributions of Luck

Source	DF	SS	MS	F	PR > F
Model	10	5.24	0.52	1.34	.207
Error	429	167.98	0.39		
Corrected Total	439	173.23			
Child's IQ	1	0.58		1.49	.223
Mathematics	1	0.01		0.02	.884
Reading	1	0.00		0.01	.929
Father's Education	3	2.43		2.07	.104
Child's Sex	1	0.07		0.17	.680
FED x Sex	3	1.65		1.40	.242

Parents' Expectations

Hypothesis 2 stated that there is no significant relationship between parents' expectations of children's education and

a. father's educational level,

b. child's sex,

c. child's IQ, and

d. parents' attribution of effort.

The differences between father's educational level and between boys and girls were examined by the use of analysis of covariance with child's IQ and parents' attribution of effort as covariates. The results, presented in Table 9, showed no interaction between father's educational level and child's sex, but significant differences appeared for both father's educational level ($p < .01$) and child's sex ($p < .05$). In addition, the effect of child's IQ was also significant, but there was no significant effect for parents' attribution of effort. Therefore, this hypothesis was partly rejected. The reduced model used child's IQ as a covariate and its results, presented in Table 10, showed that there was significant differences for parents' expectations between father's educational level, but no significant difference between boys and girls. Adjusted means, summarized in Table 11, showed that parents' expectations for children of fathers with higher education were significantly higher than that for children of fathers with senior high school, junior high school, and elementary school education. Parents' expectations for children of fathers with senior and junior high school education were significantly higher than that for children of fathers with elementary school education. There were no significant differences between children of fathers with junior and with senior high school education.

Results of a path analysis, presented in Figure 2 and Figure 3, showed that the strongest influence on parents' expectations was from child's IQ (.404, $p < .01$), followed by father's educational level (.284, $p < .01$). The influence from child's sex (.076) and parents' attribution of effort (-.006) was negligible ($p > .05$). Altogether, the model accounted for 30% of the variance of parents' expectations.

Parents' Achievement-Supporting Behaviors

Hypothesis 3 stated that there is no significant relationship between parents' achievement-supporting behaviors and

1. father's educational level,
2. child's sex,
3. child's IQ,
4. parents' attribution of effort, and
5. parents' expectations.

Table 9

Analysis of Covariance for Parents' Expectations

Source	DF	SS	MS	F	PR > F
Model	9	1421.54	157.95	21.65	.000
Error	430	3137.15	7.30		
Corrected Total	439	4558.69			
Child's IQ	1	683.39		93.67	.000
Effort Attribution	1	0.17		0.02	.877
Father's Education	3	364.55		16.66	.000
Child's Sex	1	29.13		3.99	.046
FED x Sex	3	17.21		0.79	.502

Table 10

Reduced Model of Analysis of Covariance for Parents' Expectations

Source	DF	SS	MS	F	PR > F
Model	5	1404.20	280.84	38.64	.000
Error	434	3154.50	7.27		
Corrected Total	439	4558.69			
Child's IQ	1	701.08		96.46	.000
Father's Education	3	363.43		16.67	.000
Child's Sex	1	22.36		3.08	.080

Table 11

Adjusted Means for Parents' Expectations

			PR > T			
	Mean	Std Err	Elem.	Jr. Hi.	Sr. Hi.	Hi. Ed.
Elem.	13.28	0.22	.	.000	.000	.000
Jr. Hi.	14.59	0.28	.000	.	.698	.000
Sr. Hi.	14.73	0.23	.000	.698	.	.001
Hi. Ed.	16.17	0.37	.000	.000	.001	.
Male	14.92	0.19	PR > T			
Female	14.47	0.19	.080			

Parents' achievement-supporting behaviors consisted of six variables: time for homework, time for watching television, tutoring for academic subjects, supplementary lessons outside of school, resources for learning, and treatment of poor academic performance. Among these variables, time for homework was divided into homework assigned by teacher and additional study required by parents. Supplementary lessons were measured by the number of lessons attended and time for supplementary lessons. Treatment of poor performance was divided into help and punishment.

Results of analysis of covariance showed the interaction between father's educational level and child's sex was not significant for all variables. There were also no significant differences between either father's educational levels or boys versus girls in time for additional study--Table 13, time for tutoring--Table 14, treatment of poor performance by help--Table 15. The means of the 440 respondents for these variables are summarized in Table 12 which showed that time for additional study required by parents was 5.09 hours a week, time of tutoring for academic subjects was 1.29 hours a week. However, only 151 or 34.3% of the respondents had a tutor for their children.

Table 12

Means and Standard Deviations for Additional Study, Academic Tutoring, Help for Poor Performance, and Punishment for Poor Performance for Male and Female Children and Father's Educational Level

Items	Sex	Elem.	Jr. Hi.	Sr. Hi.	Hi. Ed.	Total
Additional Study	M	3.85	5.25	4.98	6.02	4.80
		(3.74)	(3.60)	(3.61)	(3.64)	(3.70)
	F	5.12	5.45	5.83	5.05	5.37
		(3.97)	(3.78)	(3.29)	(3.79)	(3.72)
Academic Tutoring	M	1.44	1.50	1.08	1.43	1.34
		(2.37)	(2.10)	(1.85)	(2.45)	(2.14)
	F	1.04	0.92	1.54	1.58	1.24
		(1.80)	(1.69)	(2.22)	(1.98)	(1.94)
Help for Poor Performance	M	5.63	5.87	5.50	6.61	5.75
		(2.10)	(1.92)	(2.08)	(1.64)	(2.02)
	F	5.30	5.23	5.97	6.71	5.67
		(1.93)	(2.15)	(2.30)	(1.55)	(2.09)
Punishment for Poor Performance	M	4.54	5.20	5.15	4.74	4.93
		(1.53)	(1.23)	(1.35)	(1.32)	(1.40)
	F	4.56	4.51	4.59	4.00	4.48
		(1.69)	(1.50)	(1.57)	(1.37)	(1.58)

Table 13

Analysis of Covariance for Time for Additional Study Required by Parents

Source	DF	SS	MS	F	PR > F
Model	10	298.61	29.86	2.22	.016
Error	429	5763.93	13.44		
Corrected Total	439	6062.54			
Child's IQ	1	11.36		0.85	.358
Effort Attribution	1	21.42		1.59	.207
Expectations	1	109.04		8.12	.005
Father's Education	3	39.50		0.98	.402
Child's Sex	1	16.89		1.26	.263
FED x Sex	3	50.99		1.27	.286

Table 14

Analysis of Covariance for Time of Tutoring for Academic Subjects

Source	DF	SS	MS	F	PR > F
Model	10	65.90	6.59	1.60	.103
Error	429	1764.02	4.11		
Corrected Total	439	1829.92			
Child's IQ	1	0.02		0.00	.952
Effort Attribution	1	16.85		4.10	.044
Expectations	1	18.55		4.51	.034
Father's Education	3	2.55		0.21	.892
Child's Sex	1	0.27		0.06	.799
FED x Sex	3	18.07		1.47	.223

Table 15

Analysis of Covariance for Treatment of Poor Performance by Help

Source	DF	SS	MS	F	PR > F
Model	10	114.63	11.46	2.83	.002
Error	429	1737.71	4.05		
Corrected Total	439	1852.34			
Child's IQ	1	0.16		0.04	.845
Effort Attribution	1	0.17		0.04	.839
Expectations	1	27.65		6.83	.009
Father's Education	3	30.35		2.50	.059
Child's Sex	1	0.29		0.07	.789
FED x Sex	3	17.83		1.47	.223

There were significant differences between father's educational level and between child's sex for time for homework assigned by teacher and for number of supplementary lessons; significant differences between father's educational level for time for watching television, time for supplementary lessons, and resources for learning; and significant differences between boys and girls for treatment of poor performance by punishment. These results are illustrated as follows.

Time for Homework Assigned by Teacher

Results of ANCOVA for time for homework assigned by teacher, presented in Table 16, showed that there were significant differences between father's educational level ($p < .05$) and between child's sex ($p < .01$). The effect of parents' expectations was also significant ($p < .05$). The reduced model used parents' expectations as a covariate and its results are presented in Table 17. Adjusted means, summarized in Table 18, showed that when time for homework was analyzed for each level of father's education, children of fathers with elementary school spent the least time on homework, but the differences were significant only in comparison of children of fathers with junior high school ($p < .05/6$). No significant differences existed between other groups. In addition, girls spent more time on homework than boys. The average time for homework for the 440 respondents was 8.77 hours a week.

Time for Watching Television

Results of ANCOVA for time for watching television, presented in Table 19, showed that the differences were significant between father's educational level ($p < .01$), but were not significant between boys and girls. The effect of parents' expectations was also significant ($p < .01$). The reduced model used parents' expectations as a covariate and its results are presented in Table 20. Adjusted means, summarized in Table 21, showed that when time for watching television was analyzed for each level of father's education, children of fathers with higher education spent less time watching television than children of fathers with elementary school or children of fathers with junior high school ($p < .05/6$). Children of fathers with senior high school spent less time watching television than children of fathers with elementary school ($p < .05/6$), but the differences between other groups were not significant. The average time for watching television was 14.18 hours a week.

Time for Supplementary Lessons Outside of School

Results of ANCOVA for time for supplementary lessons outside of school, presented in Table 22, showed that the differences were significant between father's educational level ($p < .01$), but were not significant between boys and girls. The effect of parents' expectations was also significant ($p < .01$). The reduced model used parents' expectations as a covariate and its results are presented in

Table 23. Adjusted means, summarized in Table 24, showed that when time for supplementary lessons was analyzed for each level of father's education, the significant difference existed only between children of fathers with higher education and children of fathers with the other three education levels ($p < .05/6$). That is, children of fathers with higher education spent more time on supplementary lessons outside of school. The average time for lessons outside of school was 1.14 hours a week.

Number of Supplementary Lessons Outside of School Attended

Results of ANCOVA for number of supplementary lessons outside of school, presented in Table 25, showed that there were significant differences between father's educational level ($p < .01$) and between boys and girls ($p < .01$) , and the effect of child's IQ and parents' expectations was also significant ($p < .01$). The reduced model used both child's IQ and parents' expectations as covariates and its results are presented in Table 26. Adjusted means, summarized in Table 27, showed that when number of supplementary lessons was analyzed for each level of father's education, children of fathers with higher education attended more supplementary lessons than other three groups; children of fathers with junior and senior high school education attended more supplementary lessons than children of fathers with elementary school education ($p < .05/6$). In addition, girls attended more supplementary lessons than boys. There were

192 respondents (43.6%) whose children never attended any lessons outside of school.

Resources for Learning

Results of ANCOVA for resources for learning, presented in Table 28, showed that significant differences appeared between father's educational level ($p < .01$), but no significant differences existed between boys and girls; the effect of parents' expectations was also significant ($p < .01$). The reduced model used parents' expectations as a covariate and its results are presented in Table 29. Adjusted means, summarized in Table 30, showed that when resources for learning was analyzed for each level of father's education, children of fathers with higher education were provided more resources than the other three groups ($p < .05/6$). Children of fathers with senior high school education were provided more resources than children of fathers with junior high school and with elementary school education ($p < .05/6$).

Treatment of Poor Performance by Punishment

Results of ANCOVA for treatment of poor performance by punishment, presented in Table 31, showed that significant differences existed between boys and girls ($p < .01$), but no significant differences existed between father's educational level; and, there was no significant effect of all covariates. Boys were treated by punishment more than did girls.

Table 16

Analysis of Covariance for Time for Homework

Source	DF	SS	MS	F	PR > F
Model	10	577.08	57.71	4.00	.000
Error	429	6195.72	14.44		
Corrected Total	439	6772.79			
Child's IQ	1	23.71		1.64	.201
Effort Attribution	1	17.25		1.19	.275
Expectations	1	78.23		5.42	.020
Father's Education	3	152.88		3.53	.015
Child's Sex	1	223.36		15.47	.000
FED x Sex	3	7.33		0.17	.917

Table 17

Reduced Model of Analysis of Covariance for Time for Homework

Source	DF	SS	MS	F	PR > F
Model	5	526.07	105.21	7.31	.000
Error	434	6246.73	14.39		
Corrected Total	439	6772.79			
Expectations	1	57.88		4.02	.046
Father's Education	3	143.32		3.32	.020
Child's Sex	1	279.56		19.42	.000

Table 18

Adjusted Means for Time for Homework

			PR > T			
	Mean	Std Err	Elem.	Jr. Hi.	Sr. Hi.	Hi. Ed.
Elem.	8.15	0.31	.	.006	.340	.027
Jr. Hi.	9.56	0.39	.006	.	.060	.971
Sr. Hi.	8.59	0.33	.340	.060	.	.113
Hi. Ed.	9.58	0.54	.027	.971	.113	.
Male	8.17	0.27	PR > T			
Female	9.78	0.27	.000			

Table 19

Analysis of Covariance for Time for Watching Television

Source	DF	SS	MS	F	PR > F
Model	10	2498.33	249.83	8.14	.000
Error	429	13172.12	30.70		
Corrected Total	439	15670.45			
Child's IQ	1	58.41		1.90	.169
Effort Attribution	1	17.70		0.58	.448
Expectations	1	477.81		15.56	.000
Father's Education	3	736.50		8.00	.000
Child's Sex	1	53.20		1.73	.189
FED x Sex	3	17.27		0.19	.905

Table 20

Reduced Model of Analysis of Covariance for Time for Watching Television

Source	DF	SS	MS	F	PR > F
Model	5	2414.48	482.90	15.81	.000
Error	434	13255.97	30.54		
Corrected Total	439	15670.45			
Expectations	1	760.76		24.91	.000
Father's Education	3	756.63		8.26	.000
Child's Sex	1	84.13		2.75	.098

Table 21

Adjusted Means for Time for Watching Television

			PR > T			
	Mean	Std Err	Elem.	Jr. Hi.	Sr. Hi.	Hi. Ed.
Elem.	15.68	0.46	.	.216	.000	.000
Jr. Hi.	14.76	0.58	.216	.	.016	.004
Sr. Hi.	12.95	0.48	.000	.016	.	.262
Hi. Ed.	11.93	0.78	.000	.004	.262	.
Male	14.27	0.39	PR > T			
Female	13.39	0.40	.098			

Table 22

Analysis of Covariance for Time for Supplementary Lessons

Source	DF	SS	MS	F	PR > F
Model	10	225.04	22.50	6.54	.000
Error	429	1476.22	3.44		
Corrected Total	439	1701.26			
Child's IQ	1	8.32		2.42	.121
Effort Attribution	1	7.50		2.18	.141
Expectations	1	37.03		10.76	.001
Father's Education	3	52.73		5.11	.002
Child's Sex	1	3.66		1.06	.303
FED x Sex	3	0.91		0.09	.967

Table 23

Reduced Model of Analysis of Covariance for Time for Supplementary Lessons

Source	DF	SS	MS	F	PR > F
Model	5	207.05	41.41	12.03	.000
Error	434	1494.22	3.44		
Corrected Total	439	1701.26			
Expectations	1	67.05		19.47	.000
Father's Education	3	60.31		5.84	.001
Child's Sex	1	5.62		1.63	.202

Table 24

Adjusted Means for Time for Supplementary Lessons

			PR > T			
	Mean	Std Err	Elem.	Jr. Hi.	Sr. Hi.	Hi. Ed.
Elem.	0.77	0.15	.	.145	.069	.000
Jr. Hi.	1.14	0.19	.145	.	.848	.004
Sr. Hi.	1.19	0.16	.069	.848	.	.003
Hi Ed.	2.09	0.26	.000	.004	.003	.
Male	1.18	0.13	PR > T			
Female	1.41	0.13	.202			

Table 25

Analysis of Covariance for Number of Supplementary Lessons

Source	DF	SS	MS	F	PR > F
Model	10	372.19	37.22	18.54	.000
Error	429	861.39	2.01		
Corrected Total	439	1233.58			
Child's IQ	1	15.03		7.48	.007
Effort Attribution	1	1.56		0.48	.378
Expectations	1	28.21		14.05	.000
Father's Education	3	126.32		20.97	.000
Child's Sex	1	23.91		11.91	.000
FED x Sex	3	14.50		2.41	.067

Table 26

Reduced Model of Analysis of Covariance for number of Supplementary Lessons

Source	DF	SS	MS	F	PR > F
Model	6	356.44	59.41	29.33	.000
Error	433	877.14	2.03		
Corrected Total	439	1233.58			
Child's IQ	1	17.55		8.67	
Expectations	1	25.83		12.75	.003
Father's Education	3	144.91		23.84	.000
Child's Sex	1	14.16		6.99	.009

Table 27

Adjusted Means for Number of Supplementary Lessons

			PR > T			
	Mean	Std Err	Elem.	Jr. Hi.	Sr. Hi.	Hi. Ed.
Elem.	0.71	0.12	.	.007	.000	.000
Jr. Hi.	1.22	0.15	.007	.	.150	.000
Sr. Hi.	1.50	0.12	.000	.150	.	.000
Hi. Ed.	2.72	0.20	.000	.000	.000	.
Male	1.35	0.10	PR > T			
Female	1.72	0.10	.009			

Table 28

Analysis of Covariance for Resources for Learning

Source	DF	SS	MS	F	PR > F
Model	10	173.79	17.38	13.06	.000
Error	429	570.90	1.33		
Corrected Total	439	744.69			
Child's IQ	1	3.92		2.95	.087
Effort Attribution	1	0.01		0.01	.927
Expectations	1	26.55		19.95	.000
Father's Education	3	53.90		13.50	.000
Child's Sex	1	4.39		3.30	.070
FED x Sex	3	5.49		1.37	.250

Table 29

Reduced Model of Analysis of Covariance for Resources for Learning

Source	DF	SS	MS	F	PR > F
Model	5	163.84	32.77	24.48	.000
Error	434	580.85	1.34		
Corrected Total	439	744.69			
Expectations	1	46.33		34.62	.000
Father's Education	3	55.77		13.89	.000
Child's Sex	1	6.56		4.90	.027

Table 30

Adjusted Means for Resources for Learning

			PR > T			
	Mean	Std Err	Elem.	Jr. Hi.	Sr. Hi.	Hi. Ed.
Elem.	2.30	0.10	.	.410	.000	.000
Jr. Hi.	2.43	0.12	.410	.	.003	.000
Sr. Hi.	2.89	0.10	.000	.003	.	.005
Hi. Ed.	3.42	0.16	.000	.000	.005	.
Male	2.63	0.08	PR > T			
Female	2.88	0.08	.027			

Table 31

Analysis of Covariance for Treatment of Poor Performance by Punishment

Source	DF	SS	MS	F	PR > F
Model	10	57.99	5.80	2.63	.004
Error	429	946.01	2.21		
Corrected Total	439	1004.00			
Child's IQ	1	1.11		0.50	.479
Effort Attribution	1	6.12		2.78	.096
Expectations	1	0.63		0.29	.593
Father's Education	3	14.23		2.15	.093
Child's Sex	1	22.09		10.02	.002
FED x Sex	3	11.15		1.69	.169

A factor analysis with varimax rotation was performed to identify the common factors in the observed nine items of parents' achievement-supporting behaviors. According to the eigenvalues of the correlation matrix, presented in Table 32, and the orthogonal rotated factor pattern, presented in Table 33, two factors were identified. One factor included time for homework assigned by the teacher and time for additional study required by parents, which was labeled homework. Another factor consisted of time for television, time for tutoring, time for supplementary lessons, number of supplementary lessons, resources for learning, and treatment by help, which was labeled parents' supporting behaviors. Treatment of punishment was negligible and was discarded. The factor of homework may be affected mostly by the classroom teacher, while the factor of parents' supporting behaviors may be mainly controlled by parents. These two factors were used to represent parents' achievement-supporting behaviors in the path analysis and it was assumed that homework was influenced by supporting behaviors in the path model.

Results of path analysis for parents' supporting behaviors are presented in Figure 2 and Figure 3. These showed that the strong influence on parents' supporting behaviors was from father's educational level (.314, $p < .01$) and from parents' expectations (.292, $p < .01$), and a small influence was from child's IQ (.098, $p < .05$) and child's sex (-.087, $p < .05$). The influence from parents' attribution of effort was negligible (.040, $p > .05$). Altogether, the model accounted for 31% of the variance of supporting behaviors. Results of path analysis for homework are also presented in Figure 2 and Figure 3. There was moderate influence on homework by child's sex (-.169, $p < .01$) and from parents' expectations (.166, $p < .01$). The influence from other variables was not significant ($p > .05$). Altogether, the model accounted for only 7% of the variance of homework.

Table 32

Eigenvalues of the Correlation Matrix of Parents' Achievement-Supporting Behaviors

1	2	3	4	5	6	7	8	9
2.41	1.31	1.01	0.99	0.87	0.76	0.67	0.61	0.36

Table 33

Rotated Factor Pattern of Achievement-Supporting Behaviors

Variable		Factor 1	Factor 2
1	Time for Homework	0.14	0.76
2	Time for Additional Study	0.12	0.81
3	Time for Television	-0.57	-0.17
4	Time for Academic Tutoring	0.34	-0.04
5	Number of Supplementary Lessons	0.84	-0.07
6	Time for Supplementary Lessons	0.75	-0.06
7	Resources for Learning	0.68	-0.01
8	Help for Poor Performance	0.39	0.18
9	Punishment for Poor Performance	-0.13	0.21

Influences on Children's Academic Achievement

Hypothesis 4 stated that there is no significant relationship between children's academic achievement and

a. father's educational level,

b. child's sex,

c. child's IQ,

d. parents' expectations, and

e. parents' achievement-supporting behaviors.

In examining this hypothesis, mathematics achievement and reading achievement were analyzed separately. Parents' achievement-supporting behaviors had been divided into homework and parents' supporting behaviors by factor analysis. Child's sex was coded 0 for female and 1 for male. Zero-order correlations among variables are presented in Table 33. A path analysis was performed to examine the direct and indirect effect of father's educational level, child's sex, child's IQ, parents' expectations, homework, and parents' supporting behaviors on children's mathematics achievement and reading achievement.

Results of a path analysis for mathematics achievement are summarized in Figure 2. It showed that the strongest direct influence on mathematics achievement was from child's IQ (path = .347, $p < .01$) and from parents' expectations (.324, $p < .01$), followed by supporting behaviors (.131, $p < .01$). Child's sex also had small direct influence (.084, $p < .05$). The direct influence from father's educational level (.033, $p > .05$) and from homework (.033, $p > .05$) was negligible. Father's educational level did have an indirect effect (IE) on mathematics achievement mediated by supporting behaviors and parents' expectations (IE = .105). Child's IQ also had indirect effect but it was mainly mediated by parents' expectations (IE = .149). Generally, child's IQ had the strongest influence on mathematics achievement, including a strong direct effect and a moderate indirect effect. The second strongest influence was parents' expectations which had a strong direct effect; followed by supporting behaviors which had a moderate direct effect and father's educational level which had a moderate indirect effect. Child's sex also had a small direct effect. Homework did not have any effect. Altogether, this model accounted for 44% of the variance on children's mathematics achievement.

Results of a path analysis for reading achievement are presented in Figure 3. These results showed that the strongest direct influence on reading achievement was from parents' expectations (.367, $p < .01$). The second strongest influence was from child's IQ (.296, $p < .01$), followed by child's sex (-.205, $p < .01$) and father's educational level (.177, $p < .01$). Supporting behaviors had a small direct influence (.081, $p < .05$), but the influence from homework was negligible (.007, $p > .05$). In addition, child's IQ had a moderate indirect effect (IE = .166) mediated by parents' expectations. Father's educational level also had a moderate indirect effect mediated by expectations (IE = .137). Generally, child's IQ had the strongest influence on reading achievement including a strong direct effect and a moderate indirect effect. The second strongest influence was from parents' expectations which had a strong direct effect, followed by father's educational level which had a moderate direct and indirect effect. Child's sex had a moderate direct effect and supporting behaviors had a small direct effect. Homework did not have any significant effect. Altogether, this model accounted for 52% of variance on children's reading achievement.

With regard to parents' attribution of effort, although it was assumed to be affected by children's academic achievement, it is likely to have indirect effect on children's academic achievement mediated by expectations, supporting behaviors and homework. However, results showed attribution of effort did not have any indirect effect on either mathematics or reading achievement, and it has been demonstrated that it was not significantly affected by children's academic achievement.

Table 34

Zero-Order Correlations among Variables Used in Path Analysis

Variable	1	2	3	4	5	6	7	8	9
1 Reading									
2 Mathematics	.61								
3 Homework	.15	.11							
4 Supporting Beh.	.44	.40	.17						
5 Expectations	.60	.57	.17	.45					
6 Effort Att.	.12	.12	-.05	.12	.08				
7 Child's IQ	.54	.55	.03	.32	.47	.10			
8 Child's Sex	-.18	.09	-.16	-.06	.08	.01	-.01		
9 Father's Ed.	.42	.31	.12	.45	.38	.15	.24	.02	

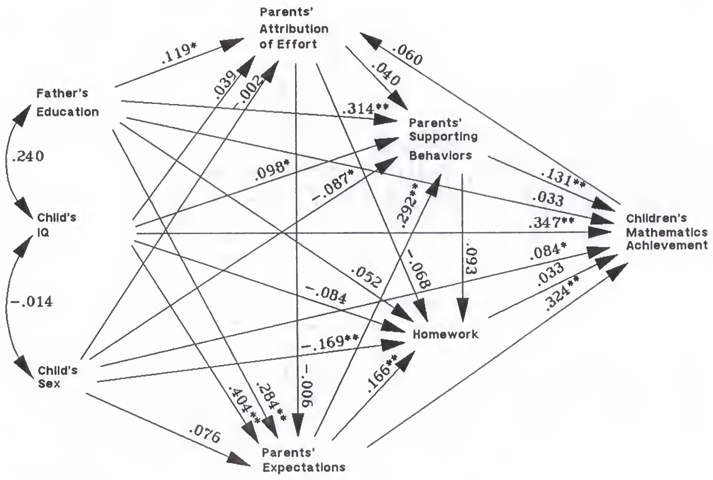

Figure 2

Path Model of the Effect on Children's Mathematics Achievement
(* p < .05, ** p < .01)

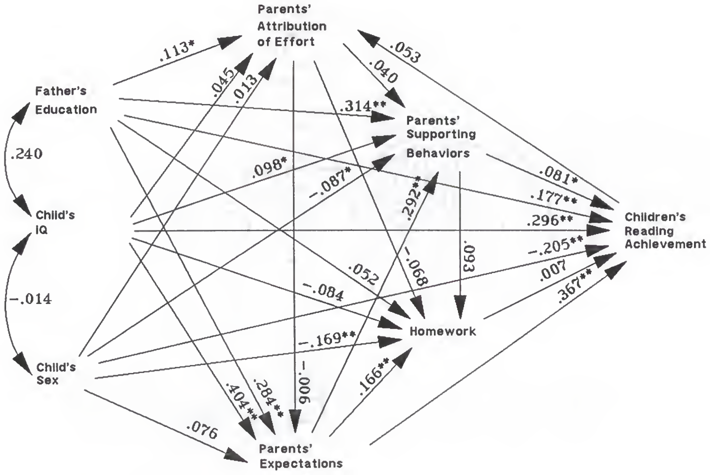

Figure 3

Path Model of the Effect on Children's Reading Achievement
(* p < .05, ** p < .01)

CHAPTER V
DISCUSSION AND CONCLUSION

The primary purpose of this study was to explore the model of relationships between attributions, expectations, and achievement-supporting behaviors of Taiwanese parents and their children's academic achievement. A detailed analysis of the specific differences in parents' attributions, expectations, and achievement-supporting behaviors between father's educational level and child's sex was also stressed.

The sample was composed of 554 sixth-grade students and their parents from 12 randomly selected elementary schools. Parents were asked to fill out a questionnaire adapted from Stevenson's Parents Interview Questionnaire (Stevenson, 1990), while students were given a mathematics achievement test, a reading achievement test and the Standard Progressive Matrices Test (Raven, 1958, 1983). The number of parents' questionnaires and students' scores that were useful for analysis was 440. A two-way analysis of covariance was performed to examine the difference in parents' attributions, expectations, and achievement-supporting behaviors between father's four educational levels and between boys and girls. A path analysis with the use of a series of standardized multiple regressions was performed to estimate the path coefficient from each variable to children's academic achievement which was represented by mathematics score and reading score, respectively. Before performing path analyses, a factor analysis was done to search for common factors in parents' achievement-supporting behaviors, and two factors labelled homework and parents' supporting behaviors were identified.

Hypothesis 1 was not rejected by the use of ANCOVA. It was concluded that there was no significant relationship between parents' attributions and father's educational level, child's sex, IQ, and academic achievement. However, the attribution of effort was somewhat influenced by father's educational level which was shown in the results of path analyses when mathematics achievement and reading achievement were put into the model separately. The group with higher father's educational level tended to attribute more to child's effort. With the distribution of 10 points to 5 causes according to the relative importance of each cause on children's academic performance, child's effort was considered the most important. The second most important cause was teacher's teaching. Child's ability was the third, followed by parents' help. Luck was negligible.

Hypothesis 2 was partially rejected. It was concluded that there were significant relationships between parents' expectations and father's educational level, and child's IQ, but no relationship with parents' attribution of effort. The relationship between parents' expectations and child's sex was not clear. Although results of ANCOVA showed that parents' expectations of boys were higher than that of girls ($p < .05$), results of a path analysis did not demonstrate a significant influence from child's sex to parents' expectations. It was demonstrated that child's IQ and father's educational level had a strong effect on parents' expectations. The higher the father's educational level, the higher was the parents' expectations.

Hypothesis 3 focused on parents' achievement-supporting behaviors which included 9 items. No significant differences existed between father's educational level and between child's sex for time for additional study, time for tutoring, and treatment by help. Only parents' expectations had significant effect on these three variables. Time for homework was significantly related to father's educational level, child's sex, and parents' expectations. Girls spent more time on homework. Children of fathers with elementary school education spent the least time on homework. The number of supplementary lessons was significantly related to father's educational level, child's sex, child's IQ, and parents' expectations. Children of fathers with higher education attended more supplementary lessons, and girls attended more supplementary lessons than boys. Time for television had a significant relationship with father's educational level, and parents' expectations, but no relationship with child's sex. Children of fathers with lower education spent more time watching television. Time for supplementary lessons had a significant relationship with father's educational level and parents' expectations, but no relationship with child's sex. Children of fathers with higher education spent more time on supplementary lessons. Resources for learning had a significant relationship with father's educational level and parents' expectations, but no relationship with child's sex. Children of fathers with higher education were provided more resources for learning. Treatment by punishment was only related to child's sex. Boys were significantly more often treated by punishment for poor performance.

A factor analysis was done to identify common factors among the nine items of parents' achievement-supporting behaviors and two factors appeared which were labelled as homework and parents' supporting behaviors, respectively. The factor of homework consisted of time for homework and time for additional study, while the factor of parents' supporting behaviors included all other items except treatment by punishment which was negligible. Homework was assumed to be somewhat influenced by classroom teacher, whereas parents' supporting behaviors were under parents' control. Results of a path analysis showed that homework was moderately influenced by child's sex and parents' expectations. Girls spent more time on homework. Children of parents with higher expectations spent more time on homework. Parents' supporting behaviors were strongly influenced by father's educational level and parents' expectations, and a little influenced by child's sex and child's IQ. Parents' supporting behaviors were stronger in fathers with higher education level, in parents with higher expectations, and in children with higher IQs. Parents' supporting behaviors for girls were a little stronger than for boys.

Hypothesis 4 dealt with the relationship between children's academic achievement and each of the variables in the model. A path analysis was performed to explore the effect of each variable on mathematics achievement and reading achievement. In mathematics achievement, the strongest influence was from child's IQ. The second strongest influence was from parents' expectations. The direct effect of parents' supporting behaviors and indirect effect of father's educational level on mathematics achievement was also significant. In addition, child's sex had a small but significant effect. However, homework and parents' attribution of effort had no influence on mathematics achievement. In reading achievement, the strongest and second strongest influence also came from child's IQ and parents' expectations, followed by father's educational level and child's sex, with a small influence from supporting behaviors. Homework and parents' attribution of child's effort had no influence on reading achievement.

The conclusions about the main focus of this study, parents' attributions, expectations, and achievement-supporting behaviors (divided into homework and supporting behaviors) were as follows. There was no interaction between father's educational level and child's sex for all these variables. Parents' attributions neither influenced parents' expectations and achievement-supporting behaviors nor were affected by child's sex, IQ, and academic achievement. But, parents' attribution of effort was slightly affected by father's educational level. Parents' expectations had a strong influence on parents' supporting behaviors and children's academic achievement, and a moderate influence on homework. They were important mediators between both child's IQ and father's educational level, and children's academic achievement. Parents' supporting behaviors had a moderate influence on mathematics achievement and a small influence on reading achievement, and were important mediators between both parents' expectations, father's educational level, and children's academic achievement. Homework was moderately affected by child's sex and parents' expectations but had no influence on children's academic achievement.

Discussion

In this study a path model was hypothesized among the attributions, expectations, achievement-supporting behaviors of Taiwanese parents and their children's academic achievement. The model was based on Stevenson's research, Seginer's model of the course of parents' educational expectations, and Weiner's attributional theory. According to attributional theory, causal attributions were initiated by an important outcome and had an influence on expectancy of success and subsequently would produce a behavioral consequence. Thus, proposed model was that parents' attributions will be affected by children's academic achievement; will have an effect on parents' expectations, and both attributions and expectations will further influence parents' achievement-supporting behaviors; and expectations and achievement-supporting behaviors will influence children's academic achievement. In addition, father's educational level, child's sex and IQ were included in this model and were assumed to have an effect on the variables of parents' attributions, expectations, and achievement-supporting behaviors. This sequence was generally consistent to Seginer's (1983) model of the course of parents' educational expectations which assumed parents' achievement-supporting behaviors as mediators between parents' expectations and children's academic achievement while expectations were affected by several antecedents. In fact, this sequence was suggested by Stevenson (1983). Stevenson, based on his cross-cultural studies, proposed a relationship from parents' attribution of effort and high demand for children's performance to more homework and less televiewing for children and consequently to children's better achievement.

However, the results of this study with the sample of Taiwanese, showed that parents' attributions had no relationships with children's academic achievement, parents' expectations, and parents' achievement-supporting behaviors. Parents' attributions were also not influenced by child's IQ and sex except slightly affected by father's educational level. Stevenson's suggestion of the important effect of parents' attributions was not demonstrated in this study. Before concluding that parents' attributions were without any effect, two reasons need to be considered: One is that attributions of children's academic achievement may have been an established belief in Chinese culture that were very consistent among most parents although a few parents' differed in assigning extreme ratings to a specific cause that produced a high variance. Therefore, the effect can not be demonstrated within the Chinese culture. This could explain why parents' attributions were suggested by Stevenson as important factors in contributing to difference of achievement between American, Japanese, and Chinese children, but had no influence within Chinese society as found in this study. Another reason may be that the procedures used to measure parents' attributions in this study was inappropriate. Future studies should examine different approaches to measure parents' attributions.

Parents' expectations were demonstrated to have a strong effect on parents' supporting behaviors and on children's academic achievement, and moderate influence on homework. Also, parents' expectations were strongly influenced by child's IQ and father's educational level, but were not significantly influenced by child's sex. These results were generally consistent with Seginer's model of the course of parents' educational expectations and previous research. Seginer (1986) found mother's educational expectations strongly related to their sons' academic performance, and part of this effect was attributable to specific maternal behaviors. She also found that the effect of SES on children's academic achievement decomposed almost equally into a direct effect and an effect mediated by the mother's educational expectations. This study showed the effect of father's educational level, assuming it represents SES, on children's mathematics achievement was mainly mediated by expectations and supporting behaviors, whereas the direct effect was insignificant. But for reading achievement, the finding was in agreement with Seginer's report that the effect of father's educational level was decomposed equally into a direct and an indirect effect mediated by expectations. The finding that parents' expectations were strongly influenced by father's educational level and child's IQ was also consistent with other studies (e. g., Entwisle & Hayduk, 1978; Entwisle & Hayduk, 1981).

The correlations between parents' expectations and children's academic achievement as reported in this study (zero-order correlation, .60 for reading, .57 for mathematics) were somewhat higher than those of early studies which reported correlations from .23 to .52 (Keeves, 1972; Shipman, McKee, & Bridgeman, 1976; St John, 1972; Woelfel & Haller, 1971). The direct effect of expectations on children's mathematics achievement (.32) was also higher than that from Au and Harackiewicz's (1986) finding (.20). There may be a number of reasons to explain the higher correlations between parents' expectations and children's academic achievement found by this study such as broader sampling, more specific measures of children's academic achievement, and better indicators of parents' expectations. The substantial correlation between parents' expectations and children's academic achievement should be examined in future studies. In comparison to the negligible effect of parents' attributions, it is likely that parents' expectations were the primary cause of their children's academic performance.

With regard to parents' achievement-supporting behaviors, this study included nine items. Through factor analysis, two factors were identified and labelled as homework and parents' supporting behaviors. Results showed that homework had no influence either on mathematics achievement or on reading achievement. This finding supports Chen and Stevenson's (1989) finding of no significant correlation between time of homework and achievement within the Chinese culture. Although parents' expectations and child's sex had a moderate influence on homework, father's educational level and child's IQ had no influence.

Studies of American children usually indicated that time for homework was significantly related to achievement (Wolf, 1979; Keith, 1982; Keith & Page, 1985; Keith, Reimers, Fehrmann, Pottebaum, & Aubey, 1986; Walberg, 1984; Walberg, Paschal, & Weinstein, 1985). Keith (1982) concluded that time for homework contributed significantly to student grades, and its direct effect was second only to that of intellectual ability. Keith and Page (1985) found that more able students did more homework than less able ones. Moreover, Keith, Reimers, Fehrmann, Pottebaum and Aubey (1986) demonstrated that homework time had an important, positive effect on student's achievement (path = .141, $p < .01$).

The results of the present study and that of Chen and Stevenson (1989) revealed no significant relationship between time for homework and academic achievement for Chinese students. These apparently discrepant findings of the influence of homework on achievement between studies with Chinese children and with American children might be explained by the big discrepancy of time for homework between these two countries. This researcher found an average of 8.77 hours a week that Taiwanese children spent on homework assigned by the classroom teacher and 5.09 hours a week spent on additional study required by parents. Chen and Stevenson (1989) found 9.75 hours for homework a week in Chinese children versus 5.07 hours in American children. Stevenson and Lee (1990) reported that Taiwanese children spent 12.9 hours a week on homework while American children only spent 4.2 hours. If almost every child spent more time on homework than the amount of time necessary for learning, the relationship between time for homework and achievement and other variables such as child's IQ and father's educational level might disappear. That may be the situation in Taiwan. If most children spent less time on homework than was sufficient for learning, then those who spent more time on homework would produce better academic achievement. That may be the situation in the United States. The amount of time required for homework on children's academic achievement needs additional study.

Parents' supporting behaviors included time for television (negative), time for tutoring, time for supplementary lessons, number of supplementary lessons, resources for learning, and treatment of poor performance by help. Results showed a small but significant influence of parents' supporting behaviors on children's academic achievement. Parents' supporting behaviors were strongly affected by parents' expectations and father's educational level. That is, they were mediators between both parents' expectations and father's educational level and children's academic achievement. This finding was generally consistent with that of Seginer's (1986) research. Seginer proposed six parents' achievement-supporting behaviors and found four of them had significant effects on children's academic performance (path from .14 to .27) and these behaviors were influenced by parents' expectations (path from .17 to .35). Zero-order correlation between parents' supporting behaviors and children's achievement found in this study (.44 for reading, .40 for mathematics) was also similar to the findings of early studies (Plowden, 1967; Majoribanks, 1977).

Comparisons with Stevenson's Findings

In Stevenson's (Stevenson, 1983; Stevenson & Lee, 1990) cross-cultural studies of children's academic achievement, the sample of Chinese children was selected from Taipei, Taiwan, and 52% of the parents had less than a high school education. The sample for this study was selected from the midwest area of Taiwan including one city and three counties, and 57% of the parents had less than a high school education. Parents' educational level in Stevenson's research was somewhat higher than that of this study. Stevenson reported correlations between parents' education and their children's scores of mathematics and reading which ranged from .22 to .34 which was somewhat lower than the findings of this study (.31 for mathematics and .41 for reading).

Parents' attributions of their children's academic performance was one of the important factors assumed to have an influence on children's academic achievement by Stevenson. In his initial study (Stevenson, 1983), he used the method of asking mothers to distribute 10 points to 4 causes, including child's effort, child's natural ability, difficulty of schoolwork, and luck. He found that effort was given the greatest number of points, ability was second, task difficulty was third, and luck was fourth. Ratings did not differ significantly for boys and girls. In his follow-up study, mothers were asked to rate the influence various factors can have on school performance on a seven-point scale. Included in the list were studying hard (effort), intelligence (ability), a good teacher, home environment, parental assistance, study habits, the curriculum, and luck. Results showed Chinese mothers gave the highest rating to having a good teacher, studying hard as the second, the third was studying habits, followed by parental assistance and then intelligence. Correlations between mother's ratings and their education showed the educational level of the mothers was positively related to studying hard, having a good teacher, and having a good home environment. Interestingly, child's effort (studying hard) was rated as the most important cause in the initial study by the use of distributing 10 points, but was second to a good teacher in the follow-up study by the use of 7-point scale. This study used the same method of Stevenson's initial study, but provided five causes including child's effort, child's ability, teacher's teaching, parents' help, and luck. Results showed that effort received most points, the second was teacher's teaching, ability was the third, followed by parents' help, luck was the fifth. The conclusion was that child's effort and teacher's teaching were considered as major causes of children's academic achievement by Taiwanese; child's ability and parents' help were also important; whereas luck was negligible.

Stevenson also investigated children's lives at home. He found that Chinese fifth-grade children spent 12.9 hours a week on homework, more than that of American and Japanese children; spent 10.6 hours on watching television, less than that of American and Japanese children. He also found that fewer than 6% attended after-school classes either reading or mathematics and attendance at after-school academic classes had no relation to academic achievement. And, 30% of children participated in nonacademic classes such as sports, music, and art. In addition, 67% of mothers purchased workbooks for children to practice to improve academic performance. This study found more children attended supplementary lessons and after-school academic classes or had tutoring, and children spent more time on watching television (14.2 hours) and homework (8.8 hours on homework assigned by teacher and 5.1 hours on additional study required by parents, a total of 13.9 hours). Thus, the conclusion made by Stevenson that Chinese children were the most likely to engage in academic activities after school was confirmed by this study.

Limitations of the Study

After examining the results of this study, the following limitations should be noted:

1. Sixth-grade students were subjects in this study. Therefore, findings of this study should not be generalized to other age groups.

2. Father's educational level was one influential factor on parents' attributions, expectations, and achievement-supporting behaviors in this study. Although father's educational level is one important indicator in the measure of SES, it might not be the same as SES.

3. A questionnaire was used to collect parents' attributions, expectations, and behaviors. The responder to questionnaire may be mother, father, or other family members. Therefore, parents was a general term that included all responders in the family. The responders of 440 useful questionnaire consisted of 190 mothers (43.2%), 217 fathers (49.3%) and 33 others such as grandfather, grandmother, older brother, and older sister (7.5%).

4. Although the causal relationships between variables proposed in this study were based on relevant theory and previous research, some controversy was unavoidable, especially in the relationship between parents' expectations and children's achievement, and between child's IQ and parents' achievement-supporting behaviors. In this study the researcher assumed that parents' expectations influence children's achievement, and child's IQ influence parents' achievement-supporting behaviors. The reverse relationship that children's achievement affect parents' expectations, and parents' achievement-supporting behaviors affect child's IQ may also be reasonable. Furthermore, a bidirectional relationship may be more suitable. This should be explored in future longetudinal research.

Recommendations

This study demonstrated that Taiwanese parents' beliefs about the child's effort and teacher's teaching were more important than the child's ability and parents' help in contributing to children's academic achievement; that parents' expectations had strong effects on parents' supporting behaviors and children's achievement. But, this study showed that homework had no effect on achievement, and parents' supporting behaviors only had a small influence on children's achievement. These results could not support the conclusion that homework and supporting behaviors were negligible in children's academic achievement. An explanation might be that Taiwanese children had been required to spend so much time on homework and other activities that focused on improving achievement, and this requirement has been beyond the need for learning, that the relationship between effort and achievement disappeared. Therefore, it is recommended that Chinese parents and educators reduce the demands of activities relevant to academic achievement, and allow children to have more free time to develop their interests and to do activities other than homework.

Some researchers in the United States (e. g., Keith, 1982; Stevenson, 1983; Walberg, 1984) suggested American parents and teachers should require more homework for children to improve their academic achievement. Although it might produce some improvement in children's academic achievement, losses in other areas or negative side effects might emerge.

In this study the researcher hypothesized a model of relationship between attributions, expectations, achievement-supporting behaviors of parents and children's academic achievement, but did not demonstrate any effect of parents' attributions. New procedures to measure attributions should be tried in any future studies, including specifying child's high or low performance before asking parents attributions, and using several items on a five- or seven-point scale to measure attributions. The components of achievement-supporting behaviors could be revised to include more relevant variables. The SES measured by several indicators including parents' education, father's occupation, and family income could be included in this model. The grade of child and the number of siblings could be considered in any future study. In addition, responding parents should be specified as mother or father to allow a more detailed analysis. Moreover, this model may be used with teachers and children to investigate if there are causal relationships among teachers' attributions or children's attributions, expectations, related behaviors and children's outcomes (not only academic achievement).

APPENDIX
QUESTIONNAIRE OF PARENT'S BELIEFS AND PRACTICES TOWARD THEIR CHILD'S EDUCATION

Dear Parent:

This questionnaire is designed to discover how parents help improve their children's school achievement. Questions inquire your attributions, expectations, and achievement-supporting behaviors to your 6th-grade child's school education.

This is an academic study; all data will be kept secret except being analyzed by the researcher. There are no right or wrong answers to the questions; just answer them according to what you did and what you thought.

Thank you for your time in filling out this questionnaire. Please close it with the attached envelop and then, send it to classroom teacher through your child.

Sincerely yours,
Lai, Ching-Piao
Associate Professor at Taichung Teacher's College

I. Descriptions of answering:

1. Answered by Mother (or Father).
2. Make a "x" mark before the proper item when items of a question are provided, or fill out something when there is an underline.

II. Demographic information:

Child's name:______________________ Sex:_________

School attended:_________________________________

Father's education:

( ) Elementary school, ( ) Junior high school,
( ) Senior high school, ( ) Junior college,
( ) College, ( ) Graduate school.

Mother's education:

( ) Elementary school, ( ) Junior high school,
( ) Senior high school, ( ) Junior college,
( ) College, ( ) Graduate school.

Name of answerer:_____________________

Relationship to the child:__________________________

III. Questions:

1. How much schooling do you wish your child to have?

( ) Junior high school

( ) Senior high school

( ) Junior college

( ) College

( ) Graduate school

2. How much schooling do you estimate your child will be able to receive?

( ) Junior high school

( ) Senior high school

( ) Junior college

( ) College

( ) Graduate school

3. How well do you wish your child to achieve if the average score of a 6th-grade academic test is 75?

( ) Below 60

( ) 61--70

( ) 71--80

( ) 81--90

( ) Over 91

4. How much score do you estimate your child will be able to achieve if the average score of a 6-grade academic test is 75?

   ( ) Below 60
   ( ) 61--70
   ( ) 71--80
   ( ) 81--90
   ( ) Over 91

5. There are many causes that contribute to a child's academic achievement such as child's ability, teacher's teaching, luck, child's effort, and parents' help. Which is the most important cause for your child's school achievement? Which is the second? the third? the fourth? and the fifth? If there are a total of 10 points to be distributed to these five causes according to the importance of each cause, what's your distribution?

Causes	Rank of importance	Points
Child's ability	________________	__________
Teacher's teaching	________________	__________
Luck	________________	__________
Child's effort	________________	__________
Parents help	________________	__________
		total 10 points

6. How much time a day does your child do homework assigned by the teacher?

   Average of a weekday.._____ hours _____ minutes

   Saturday............._____ hours _____ minutes

   Sunday..............._____ hours ______ minutes

7. Do you require additional study of your child beyond the homework assigned by the teacher?

   ( ) Yes

   ( ) No

8. How much time a day does your child study beyond doing homework assigned by the teacher?

   Average of a weekday.._____ hours _____ minutes

   Saturday............._____ hours _____ minutes

   Sunday..............._____ hours _____ minutes

9. Do you place restrictions on the amount of time for your child watches television?

   ( ) yes

   ( ) No

10. How much time a day does your child watch television?

Average of a weekday.._____ hours _____ minutes

Saturday............._____ hours _____ minutes

Sunday..............._____ hours _____ minutes

11. Does your child receive tutoring in school subjects such as mathematics and reading outside of school? If yes, how many hours a week?

( ) No

( ) Yes _____ hours a week

12. Have your child attended the following lessons outside of school?

( ) Music

( ) Arts

( ) Sports

( ) Abacus

( ) Computer

( ) English

( ) Others______________________

Currently, how many hours a week does your child spend on the above lessons outside of school?

________________ hours

13. Do you have the following resources for your child?

( ) Children's newspaper
( ) Children's magazine
( ) Children's encyclopedia
( ) Children's dictionary
( ) Enrichment textbooks

14. How often do you use the following treatments to your child's poor academic performance?

	Never	Seldom	Sometimes	Often	Always
Scold	( )	( )	( )	( )	( )
Console	( )	( )	( )	( )	( )
Punish	( )	( )	( )	( )	( )
Help	( )	( )	( )	( )	( )

Thank for your answering

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BIOGRAPHICAL SKETCH

Ching-Piao Lai was born on February, 1, 1950, in Taichung, Taiwan. He graduated from Taichung Junior Teacher's College in 1970. From 1970 to 1972, he served a two-year military service as a secretary on a warship, with a rank of second lieutenant.

From 1972 to 1977, Mr. Lai taught in an elementary school, while enrolled at the Department of Education, the Evening Division of Taiwan Normal University. He earned his B.Ed. in 1977. Then, he left his teaching job to become a full time graduate student in Taiwan Normal University. He was awarded a M.Ed. in 1979.

After receiving his M.Ed., Mr. Lai was invited by his alma mater, Taichung Junior Teacher's College, to join the faculty as an instructor. He has taught there until the present. Taichung Junior Teacher's College received full college status in 1987 and is now called Taichung Teacher's College.

Mr. Lai was awarded a two-year subsidy from his government and started his doctoral program in the Department of Foundations of Education, the University of Florida, in January, 1989. He will return to his country to continue his teaching at Taichung Teacher's College in January, 1991.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

John M. Newell

John M. Newell, Chair
Professor of Foundations of
Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Barry Guinagh

Barry Guinagh
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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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This dissertation was submitted to the Graduate Faculty of the College of Education and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

May 1991

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